



ATX Reference Design for AMD-640TM Chipset

Smoky Mountain 266 Users Guide

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Contents

1	Introduction	1
	Compatibility	3
	Configuration	3
	Regulatory Compliance	4
2	Motherboard Installation	5
	Beware of Static Electricity	5
	Unpacking Your Motherboard	5
	Installation Procedure	6
	Configure Processor Selection Switches	9
	Install Processor and Heatsink	12
	Install the Memory SIMMs	13
	Memory Configurations	14
	Install Motherboard In Case	15
	Connect the Front-Panel Switches and Indicator Lights	15
	Power Switch	15
	Reset Switch	15
	Keylock Switch	16
	Audio Volume Switches	16
	Power LED	16
	Hard Drive Activity LED	16
	Internal Connections	17
	Floppy Disk Drive(s)	17
	Hard Disk Drive(s)	18
	CD-ROM Drive(s)	18
	Wavetable Synthesis Daughtercard	19
	Auxilliary Cooling Fan	20
	Internal Speaker	20
	Infrared Device	21
	Install Add-In Cards	22
	Make Rear-Panel Connections	23
3	BIOS Setup	25
	Award BIOS CMOS Setup Utility	26
	Starting the Setup Utility	26
	Setup Keys	26
	In Case of Problems	27

Setup Utility Variations	27
Main Setup Menu	28
Standard Features Setup	28
BIOS Features Setup	28
Chipset Features Setup	28
Power Management Setup	29
PnP/PCI Configuration	29
Load BIOS Defaults	29
Load Setup Defaults	29
Integrated Peripherals	29
Password Setting	29
IDE HDD Auto Detection	29
HDD Low Level Format	29
Save and Exit Setup	29
Exit Without Saving	29
Standard Features Setup	30
Date	31
Time	31
Hard Disks	31
Drive A/Drive B	33
Video	33
Halt On	33
Memory	34
BIOS Features Setup	35
Virus Warning	35
CPU Internal Cache	35
External Cache	36
Quick Power On Self Test	36
Boot Sequence	36
Swap Floppy Drive	36
Boot Up Floppy Seek	36
Boot Up Numlock Status	36
Boot Up System Speed	36
IDE HDD Block Mode	36
Gate A20 Option	36
Memory Parity/ECC Check	37
Typematic Rate Setting	37
Typematic Rate (Chars/Sec)	37
Typematic Delay (Msec)	37
Security Option	37
Write Allocate Support	37
PCI/VGA Palette Snoop	37
OS Select for DRAM > 64MB	37
Shadow	37
Chipset Features Setup	39
DRAM Auto Configuration	39
DRAM Timing Control	40

Sustained 3T Write	40
2 Bank PBSRAM	40
Read Pipeline	40
Write Pipeline	40
Video BIOS Cacheable	40
System BIOS Cacheable	40
Memory Hole at 15Mb Addr	40
OnChip USB	41
USB Keyboard Support	41
Power Management Setup	42
Power Management	42
PM Control by APM	43
Video Off Option	43
Video Off Method	43
Conserve Mode	44
PM Timers	44
PM Events	44
PNP/PCI Configuration	46
Resources Controlled By	46
Reset Configuration Data	47
IRQ n Assigned To	47
DMA n Assigned To	47
CPU to PCI Write Buffer	47
PCI Dynamic Bursting	47
PCI Master 0 WS Write	47
PCI Peer Concurrency	47
PCI Delay Transaction	47
PCI IRQ Activated By	47
PCI IDE IRQ Map to	48
Integrated Peripherals	49
OnChip IDE First/Second Channel	50
IDE Prefetch Mode	50
IDE Primary/Secondary Master/Slave PIO	50
Onboard FDC Controller	50
Onboard UART 1/2	50
Onboard UART 2 Mode	50
Onboard Parallel Port	51
Parallel Port Mode	51
ECP Mode Use DMA	51
Parallel Port EPP Type	51
Onboard Sound Controller	51
IDE Primary/Secondary Master/Slave UDMA	51
Password Setting	52
Entering/Modifying A Password	52
Clearing the Password	52

4	Award BIOS Flash Upgrade Utility	53
	Before Running The Program	53
	Running The Program	54
	Flash Upgrade Utility Command Line Parameters	56
	Save/Update	56
	Clear Data	57
Appendix A	Technical Information	59
	Connector Pinouts and Port Information	60
	NS16C550-Compatible Serial Port	60
	Parallel Port	61
	Keyboard/Mouse Controller	62
	USB Controller	63
	IDE Connectors	64
	Flexible Disk Connector	65
	PCI and ISA Expansion Slot Pinouts	66
	PCI-Bus Expansion-Slot Connectors	66
	ISA-Bus Expansion-Slot Connectors	69
	Timer and DMA Channels Map	71
	I/O and Memory Map	72
	Interrupt Map	73
	RTC and CMOS RAM Map	74
Appendix B	POST Messages	77
	POST Beep Messages	77
	POST Error Messages	77
Appendix C	POST Codes	81

List of Figures

Figure 2-1.	Motherboard Switch and Connector Locations	8
Figure 2-2.	SIMM Socket Locations	14
Figure 2-3.	Front-Panel Audio Connector (J27) Pinouts	16
Figure 2-4.	Power LED Orientation.	16
Figure 2-5.	Hard Drive Activity LED Orientation	16
Figure 2-6.	CD-ROM Audio Connector (J20) Pinouts	19
Figure 2-7.	Wavetable Connector (J17) Pinouts	20
Figure 2-8.	Cooling Fan Connector (J13 & J38) Pinouts	20
Figure 2-9.	Infrared Connector (J28) Pinouts	21
Figure 2-10.	ISA and PCI Slot Location	22
Figure 2-11.	Motherboard Rear-Panel I/O Connectors	23
Figure 3-1.	CMOS Setup Utility Main Menu	28
Figure 3-2.	Standard Features Setup Screen	30
Figure 3-3.	BIOS Features Setup Screen.	35
Figure 3-4.	Chipset Features Setup Screen	39
Figure 3-5.	Power Management Setup Screen	42
Figure 3-6.	PNP/PCI Configuration Screen	46
Figure 3-7.	Integrated Peripherals Setup Screen	49
Figure 4-1.	Flash Update Program Screen	55
Figure 4-2.	Flash Utility Available Options	56
Figure A-1.	DB9 Serial Connector Pinouts	60
Figure A-2.	Parallel Port Pinouts	61
Figure A-3.	Keyboard/Mouse Connector Pinouts	62
Figure A-4.	USB Port 0 and Port 1 Pinouts	63



List of Tables

Table 1-1.	Supported Operating Environments.	3
Table 2-1.	Motherboard Connector Descriptions.	7
Table 2-2.	AMD-K6 Processor Core Voltage Settings (SW1)	9
Table 2-3.	AMD-K5 & P54C Processors Core Voltage Setting (SW1)	9
Table 2-4.	SW2 Switch Settings	10
Table 2-5.	Bus Frequency Switch Settings (SW1)	10
Table 2-6.	AMD-K5 & P54C Processors Clock Multiplier Settings (SW1)	11
Table 2-7.	AMD-K6 Processor Clock Multiplier Settings (SW3)	11
Table 2-8.	SIMM Configurations.	14
Table 2-9.	Supported Floppy Disk Drives	17
Table 3-1.	Setup Utility Navigation Keys	26
Table 3-2.	Hard Drive Specification Descriptions.	31
Table 3-3.	Flexible Disk Types	33
Table 3-4.	Video Subsystems Supported	33
Table 3-5.	Error Type Setup	33
Table 3-6.	PBSRAM Settings.	40
Table 3-7.	Available Power Management Settings	43
Table 3-8.	Available Video-Off Options	43
Table 3-9.	Available Video-Off Methods	43
Table 3-10.	Available Parallel Port Modes.	51
Table A-1.	IDE/EIDE Connector Pinouts	64
Table A-2.	Flexible Disk Drive Connector Pinouts	65
Table A-3.	PCI Connector Pinouts.	66
Table A-4.	ISA Connector Pinouts.	69
Table A-5.	Timer and DMA Channels Map.	71
Table A-6.	I/O Map	72
Table A-7.	Memory Map	72
Table A-8.	Interrupt Map	73
Table A-9.	RTC and CMOS RAM Map	74
Table C-1.	Award BIOS POST Codes.	81



1

Introduction

Thank you for your interest in the AMD-640™ chipset motherboard (code named AMD Smoky Mountain motherboard)! The AMD Smoky Mountain motherboard is a high-performance motherboard based on AMD's powerful AMD-640 chipset and fully supports the AMD-K5™ processor, AMD-K6™ MMX™ enhanced processor, and other Socket 7-compatible processors. The AMD Smoky Mountain motherboard has the following set of features:

- 12-in x 9.6-in ATX form factor
- Zero insertion force (ZIF) socket (Socket 7)
- Processor clock speeds from 75 MHz to 366 MHz
- AMD-640 chipset
- Four standard 72-pin SIMM sockets supporting up to 128 Mbytes of non-parity, fast-page mode or extended data out (EDO) DRAM
- 512 Kbytes or 1 MByte of direct-mapped L2 cache memory using four 32 Kbit by 32 or 64 Kbit by 32, 7-ns PBSRAMS
- PCI bus-mastering IDE controller supporting up to four IDE devices (either hard drives or CD-ROMs)
- Microsoft® Windows® 95-ready Plug-N-Play
- Three PCI, two ISA, and one shared PCI/ISA expansion slots (the shared PCI/ISA slot is ISA-only when the motherboard uses the S3 ViRGE video controller)
- AMD 29F002T 2-Mbit flash memory chip for flash BIOS

- Award *Elite*BIOS
- SMC FDC37C669 PC 95/96-compatible super I/O controller containing the following features:
 - Flexible disk support
 - One 16550-compatible serial port
 - One IrDA-, ASKIR-, and HPSIR-compatible infrared (IR) port
 - One EPP/ECP-capable parallel port
- Two universal serial bus (USB) interfaces that are USB 1.0- and Intel Universal HCI 1.1-compatible
- Integrated ViRGE, Trio64V+, or Trio64V S3 graphics controller with up to 4Mbytes of 50-ns, EDO DRAM video memory, supporting SVGA graphics at resolutions up to 1600 x 1200
- Integrated Crystal CS4238, CS4236, or CS4237 stereo audio controller providing MPU-401 and SoundBlaster compatibility and either SRS 3-D (CS4237) or Q-Sound 3-D (CS4238) audio
- Standard ATX back-panel I/O connector header provides the following:
 - One VGA monitor connector
 - One each PS/2-style mouse and keyboard connector
 - One 9-pin DB9 serial port connector
 - Two USB interface connectors
 - One 25-pin DB25 parallel port connector
 - One 15-pin DB15 MIDI/joystick connector
 - One each stereo line input, monaural microphone input, and stereo headphone output connector
- Supports advanced power management (APM)

Compatibility

The AMD Smoky Mountain motherboard successfully executes the software operating systems and environment managers listed in Table 1-1.

Table 1-1. Supported Operating Environments

Operating Environment	Version
DOS	5.x & 6.x
Microsoft Windows	3.11
Windows 95	1.0
Windows NT	3.5, 3.51, 4.0
IBM OS/2	3.0
SCO UNIX	V3.2 Release 4.2
SCO UNIX ODT	X11, Release 5

Configuration

General motherboard and adapter board configuration is performed through special hardware, firmware, and software provisions known as Plug-N-Play (PNP). The PNP system includes the following:

- Special hardware registers that control configuration options
- Firmware provisions in POST to transfer configuration register values from non-volatile static RAM to the registers
- Setup software used to select configuration choices and store resulting values in the static RAM

The setup software allows automatic configuration of the system options in most situations and allows selection of options using menu-driven software (with help provisions) when the user wants manual intervention.

Regulatory Compliance

Testing for the following electromagnetic interference (EMI) standards certifications are currently underway:

- FCC Class B—Title 47 of the Code of Federal Regulations (CFR) Parts 2 and 15, Subpart B, pertaining to unintentional radiators

2

Motherboard Installation

Beware of Static Electricity

The motherboard contains sensitive electronic components that can be easily damaged by static electricity. We recommend that you leave the motherboard in its original packaging until you're ready to install it.

Unpackaging and installation should be done on a grounded, anti-static mat, and the wearing of an anti-static wristband, grounded at the same point as the anti-static mat, is recommended.

Unpacking Your Motherboard

Take a moment to inspect the package for obvious damage due to shipping and handling. Be sure no noticeable damage exists before proceeding.

You should have the following items in your motherboard package:

- AMD Smoky Mountain motherboard
- One 40-pin IDE cable

- One 34-pin floppy disk cable
- AMD Smoky Mountain Motherboard Users Guide
- One set of diskettes containing audio and video drivers
- One diskette containing the Award BIOS Flash Upgrade Utility program

If you are missing any of these items, contact your local distributor for a replacement.

Remove the motherboard from the carton and place it on a grounded, anti-static surface component-side up. Inspect the motherboard for damage. Press down on all of the socketed ICs to make sure they are properly seated. You should do this only with the board placed on an anti-static mat.

DO NOT apply power to the board if it has been damaged!

Installation Procedure

Now you're ready to configure and install your motherboard. We recommend you follow this step-by-step procedure:

1. Configure the switches to support your processor.
2. Install the processor and heatsink on the motherboard.
3. Install the DRAM memory (the SIMMs).
4. Install the motherboard in the case.
5. Connect the front-panel switches and indicator lights.
6. Make all necessary internal connections, such as the hard drive cables, floppy disk cables, CD-ROM audio cable, power supply cable, etc.
7. Install any additional add-in cards you may have. These may include network interface cards, internal modems, or add-in cards you need to support other peripheral devices.

8. Make all necessary rear-panel connections. This may include connecting your mouse, keyboard, monitor, printer, etc.
9. Power-up the computer and configure the BIOS using the CMOS Setup Utility.

To help you with the installation, we have provided detailed descriptions for steps 1–8 in the following sections. The BIOS configuration is described in detail in “BIOS Setup” on page 25. Refer to Figure 2-1 to find the location of all motherboard switches and connectors. Table 2-1 lists all the connectors and gives a brief description each.

Table 2-1. Motherboard Connector Descriptions

Number	Name on Board	Comments
J1	CD ROM	Connector for CD-ROM audio cable
J14	–	Motherboard main power connector
J15	KEYLOCK	Connector for keylock switch Open = unlocked Closed = locked
J16	RESET	Connector for reset switch Momentary close = reset
J17	WAVETABLE	Connector for audio wavetable cable
J18	FLEX DISK	Connector for the floppy disk drives
J19	PWR SWITCH	Connector for power on/off switch Momentary close = toggle
J20	SPKR	Connector for internal speaker
J21	POWER LED	Connector for power LED
J22	PRIMARY IDE CONTROLLER	Connector for the primary IDE controller
J23	UP DOWN MUTE	Connector for front-panel audio volume controls (momentary closure)
J24	IR	Connector for infrared
J25	HD ACT	Connector for hard drive activity LED
J26	AUX FAN	Power connector for auxiliary fan
J27	SECONDARY IDE CONTROLLER	Connector for the secondary IDE controller

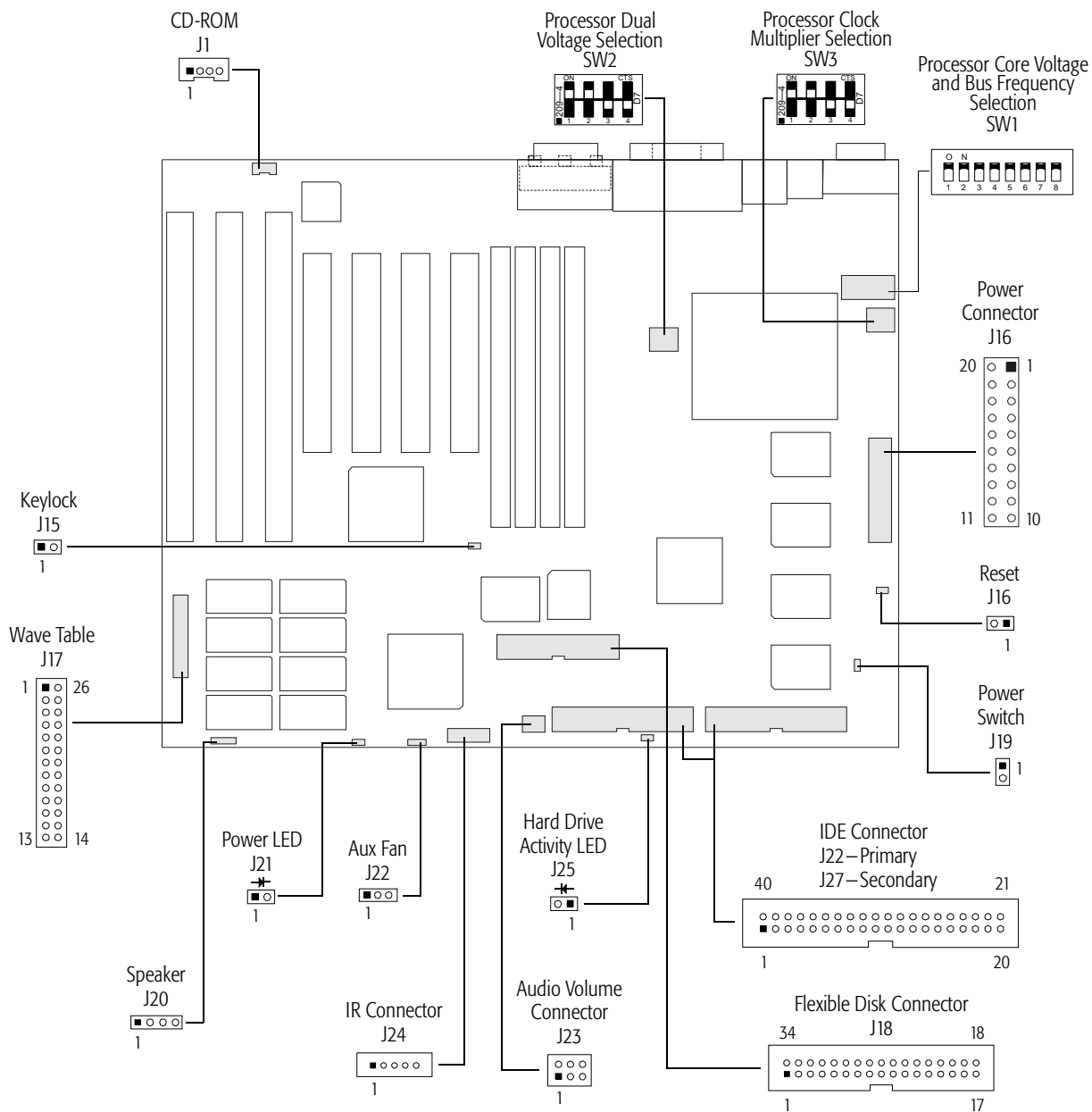


Figure 2-1. Motherboard Switch and Connector Locations

Configure Processor Selection Switches

Use switch SW1, SW2, and SW3 to setup the motherboard for your specific processor.

SW1 selects the core voltage and the bus frequency settings for the processor and the PCI bus. Table 2-2 and Table 2-3 list switch settings for the AMD-K6 and AMD-K5 (and other Socket-7) processors core voltage respectively. Table 2-4 lists the SW2 switch settings for all processors. Table 2-5 lists the bus frequency settings for all processors.

SW3 selects the clock multiplier for all processors. Table 2-6 show the settings for the AMD-K5 and other Socket-7 processors. Table 2-7 shows the switch settings for the AMD-K6 processor.

Table 2-2. AMD-K6 Processor Core Voltage Settings (SW1)

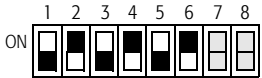



AMD-K6 MMX Processor	Core Voltage	Switch Settings
166	2.9 V	
200	2.9 V	
233	3.2 V	
266	3.2 V	

Table 2-3. AMD-K5 & P54C Processors Core Voltage Setting (SW1)



Processor	Switch Settings
AMD-K5 All Models	
All P54C	

Table 2-4. SW2 Switch Settings

Processor	Switch Settings
AMD-K5 & P54C	
AMD-K6 & Dual-Voltage Processors	

Table 2-5. Bus Frequency Switch Settings (SW1)

CPU Bus	PCI Bus	Switch Settings
50 MHz	25 MHz	
60 MHz	30 MHz	
66 MHz	33 MHz	

Table 2-6. AMD-K5 & P54C Processors Clock Multiplier Settings (SW3)

AMD-K5 Processor	P54C	Multiplier	Bus Frequency	Switch Settings
75	75	1.5	50 MHz	ON
90	90	1.5	60 MHz	ON
100	100	1.5	66 MHz	ON
PR120	120	2.0	60 MHz	ON
PR133	133	2.0	66 Mhz	ON
PR150	150	2.5	60 Mhz	ON
PR166	166	2.5	66 Mhz	ON
PR200	200	3.0	66 Mhz	ON

Table 2-7. AMD-K6 Processor Clock Multiplier Settings (SW3)

AMD-K6 Processor	Multiplier	Bus Frequency	Switch Settings
166	2.5	66 Mhz	ON
200	3.0	66 Mhz	ON
233	3.5	66 Mhz	ON
266	4.0	66 Mhz	ON

Install Processor and Heatsink

After the processor switches are configured properly, you're ready to install the processor and heatsink.

***Note:** The processor is a sensitive electronic component and can be easily damaged by static electricity. Don't touch the processor pins with your fingers.*

A cooling fan and heatsink are required to protect the AMD-K6 processor from being damaged. The AMD-K5 and other Socket 7-compatible processors can be used with a heatsink only.

Follow this procedure to ensure correct processor and heatsink installation:

1. Make sure the ZIF-socket lever is up. To raise the lever, pull it out to the side a little and raise it as far as it will go. The top plate on the ZIF socket slides back as you raise the lever.
2. Align the pin-1 corner of the processor with the pin-1 corner of the ZIF socket. The pins on the bottom of the processor should align with the holes in the ZIF socket when the processor is properly placed.
3. Insert the processor into the ZIF socket. The processor should insert easily. Don't force the processor in place. You can damage the pins by using force. If the processor doesn't drop into place easily, adjust the position of the processor and/or the position of the ZIF-socket lever slightly until the processor is seated in the socket.
4. Close the ZIF socket by rotating the lever back toward the motherboard in the opposite direction you used to open the socket. As the top plate of the socket starts to slide, you will feel some resistance as the pressure starts to secure the processor in the socket. This resistance is normal and will not damage the processor. The processor is locked securely in the socket when the lever snaps into place in the down position.

The procedure for installing the heatsink and/or fan varies depending on what kind of heatsink/fan assembly you have. Follow the instructions for your particular heatsink/fan assembly.

Note: *To ensure the proper heat conduction, be sure to use an evenly-distributed layer of thermal grease between the processor and the heatsink.*

Install the Memory SIMMs

Now you're ready to install the system memory. The motherboard supports standard 60-ns, 72-pin SIMMs. Only non-parity SIMMs are supported. You can also use EDO (extended data out) memory for improved performance.

Memory configurations are based on the following SIMM sizes:

- 4-Mbyte—1 Mbit x 32
- 8-Mbyte—2 Mbit x 32
- 16-Mbyte—4 Mbit x 32
- 32-Mbyte—8 Mbit x 32

The motherboard has four SIMM sockets, labeled S1–S4 (see Figure 2-2). For optimal memory performance, SIMMs should be installed in pairs. However, you can use individual SIMMs in sockets S1 or S3 when sockets S2 or S4 are not used, respectively. Sockets are grouped in pairs 1/2 and 3/4. The order used to fill the sockets is not restricted. You can use either pair of sockets first.

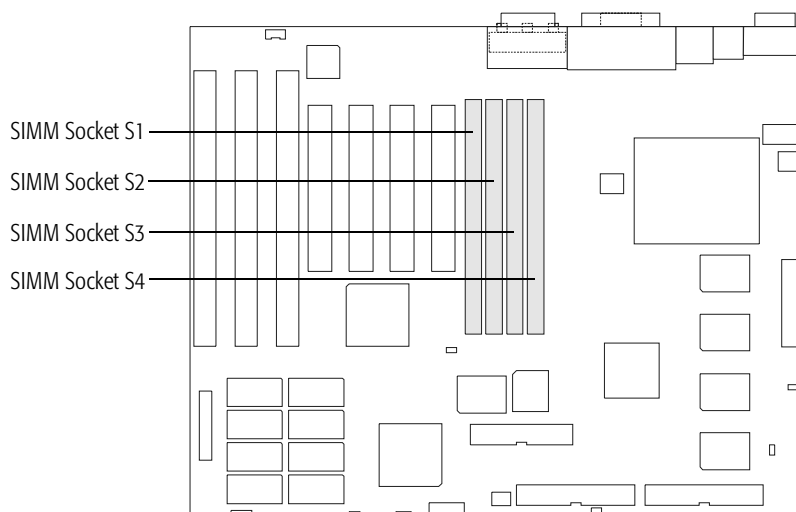


Figure 2-2. SIMM Socket Locations

Memory Configurations

Table 2-8 shows representative SIMM combinations you can use to achieve various memory configurations.

Table 2-8. SIMM Configurations¹

Total (MBytes)	Number of SIMMs	SIMMs 1 & 2 (MBytes)	SIMMs 3 & 4 (MBytes)
4	1	4 ²	
8	2	8 ³	
16	2	16	
24	4	16	8
32	2	32	
40	4	32	8
48	4	32	16
64	2	64	
72	4	64	8
80	4	64	16
96	4	64	32
128	4	64	64

Note:

¹ Other SIMM combinations can result in the same total memory.

² When using a single SIMM, place it in S1 or S3 only.

³ Two-SIMM combinations can be used in either S1/S2 or S3/S4.

Install Motherboard In Case

After configuring the switches for your processor, installing the processor and heatsink/fan, and installing the SIMM modules, you are ready to install your motherboard in the case.

The motherboard must be installed into a standard ATX-form-factor case. The rear-panel I/O connectors will not fit in any other type of case.

Be sure to use the nylon stand-offs provided with the case wherever possible, and try to attach the motherboard to the case with at least two screws. Be sure the motherboard is securely attached to the case before proceeding to the next step.

Connect the Front-Panel Switches and Indicator Lights

The possible front-panel switches and indicator lights supported by the motherboard are as follows:

- Power switch
- Reset switch
- Keylock switch
- Audio volume switches
- Power LED
- Hard drive activity LED

You may or may not have all of these front-panel switches and lights on your case. Connect the switches on your case using the following instructions.

Power Switch

The power switch connector is labeled J19 (see Figure 2-1) and is a momentary-on toggle switch. This means that if the power is off and you press the switch momentarily, the power comes on. If the power is on and you press the switch momentarily, the power goes off. This type of power switch is connected to the motherboard instead of the power supply, as is the case in most personal computer systems. Connect the two-wire power-switch connector to J19.

Reset Switch

Connect the reset switch cable to J16 (see Figure 2-1). A momentary closure of the reset switch resets the motherboard.

Keylock Switch

If your case is equipped with a keylock switch, connect the wires from the switch to J15 (see Figure 2-1). If the contacts of J15 are shorted together, the system is locked.

Audio Volume Switches

The motherboard supports front-panel audio switches to control the volume of the onboard audio system. A volume up/down and a mute function are supported. The front-panel audio switches should be connected to J23 (see Figure 2-1) as shown in Figure 2-3. When the appropriate contacts are shorted together, the volume increases, decreases, or is muted.

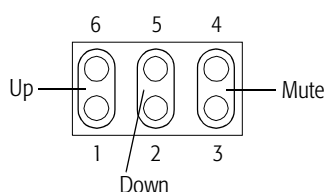


Figure 2-3. Front-Panel Audio Connector (J27) Pinouts

Power LED

The power LED connector is J21 (see Figure 2-1). See Figure 2-4 for the correct orientation of the LED contacts to the connector contacts.

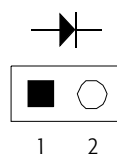


Figure 2-4. Power LED Orientation

Hard Drive Activity LED

The hard drive activity LED connector is J25 (see Figure 2-1). See Figure 2-5 for the correct orientation of the LED contacts to the connector contacts.

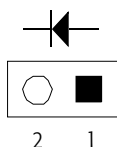


Figure 2-5. Hard Drive Activity LED Orientation

Internal Connections

Now you're ready to connect the internal devices, cooling fans, and power supply. You may have some or all of the following devices to connect:

- Floppy disk drive(s)
- Hard disk drive(s)
- CD-ROM drive(s)
- Wavetable synthesis daughtercard
- Auxiliary cooling fan
- Internal speaker
- Infrared device

Follow the procedures in the following sections to connect any of these device you may have.

Floppy Disk Drive(s)

Your motherboard supports two floppy disk drives. The two drives can be any combination of the drives listed in Table 2-9.

Table 2-9. Supported Floppy Disk Drives

Type	Description
360 K, 5.25 in	5-1/4-inch, PC-type standard drive—360-Kbyte capacity
1.2 M, 5.25 in	5-1/4-inch, AT-type high-density drive—1.2-Mbyte capacity
720 K, 3.5 in	3-1/2-inch double-sided drive—720-Kbyte capacity
1.44 M, 3.5 in	3-1/2-inch double-sided drive—1.44-Mbyte capacity
2.88 M, 3.5 in	3-1/2-inch double-sided drive—2.88-Mbyte capacity

The floppy drive connector is J18 (see Figure 2-1). Make sure the cable is positioned correctly, insert the cable into the connector, and press down firmly to ensure the cable is properly seated.

The floppy-drive cable supplied with your motherboard has a keyed connector on the motherboard end of the cable. This

Pay particular attention to the orientation of the stripe on the side of the floppy and hard drive cables. The stripe should be positioned at the pin-1 end of the connector. If you connect the cable backwards, the drives will not work properly, you can't boot the computer from them, and they might be damaged.

ensures that the cable can be inserted into the connector in only one way. If you use a different cable that does not have keyed connectors, make sure the stripe down the side of the cable is positioned at the pin-1 end of the connector.

Hard Disk Drive(s)

A total of four hard drives can be attached to your motherboard—two connected to the primary IDE controller and two connected to the secondary IDE controller. The primary IDE controller connector is J22 and the secondary IDE controller connector is J27 (see Figure 2-1).

Usually, the hard drives are connected to the primary IDE controller, and other IDE devices, like CD-ROM drives and tape drives, are connected to the secondary IDE connector.

Make sure the hard-drive cable is positioned correctly, insert the cable into the primary IDE connector, and press down firmly to ensure the cable is properly seated.

The hard drive cable supplied with the motherboard has keyed connectors to ensure the cable is only connected one way. If you use a different cable that does not have keyed connectors, make sure the stripe down the side of the cable is positioned at the pin-1 end of the connector on the motherboard.

CD-ROM Drive(s)

Connect the CD-ROM drive(s) to the IDE controller (usually the secondary IDE controller) following the procedure described in the previous section for connecting hard drives.

If you want to play audio CDs on your CD-ROM drive and have the sound processed by the onboard audio system, you can connect an audio cable from the rear of the CD-ROM drive to the CD-ROM audio connector on the motherboard. The CD-ROM audio connector is J1 (see Figure 2-1).

The connector is keyed to ensure the cable is connected in only one way. The pinouts for the CD-ROM audio connector are shown in Figure 2-6.

Insert the audio cable into J1 and press down until you hear a click. The cable is then locked into place in the connector.

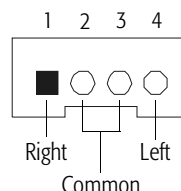


Figure 2-6. CD-ROM Audio Connector (J20) Pinouts

Wavetable Synthesis Daughtercard

Wavetable synthesis converts actual sounds of instruments to a digital code, then when you play back music, the sound processor recreates the sounds based on the stored digital samples. Sounds produced in this way are authentic because they are derived from the actual source. The sound samples are stored in either ROM (sound samples are stored at the factory) or RAM (sound samples can be uploaded by software), and the sound processor plays the different instruments when instructed to do so by a program. The program not only contains information about which instrument to play, but has information about changes in duration, pitch, etc. When you upload your own samples, you can replace factory-supplied instruments with instruments of your own choosing—your own voice, your dog barking, etc. The only limitation is the amount of RAM available to store the sounds.

Wavetable synthesis is supported on your motherboard by plugging a wavetable-synthesis daughtercard onto connector J17 (see Figure 2-1). Make sure that pin 1 of the daughtercard is aligned with pin 1 of the connector and press the card firmly onto the connector. The pinouts of the wavetable connector are shown in Figure 2-7.

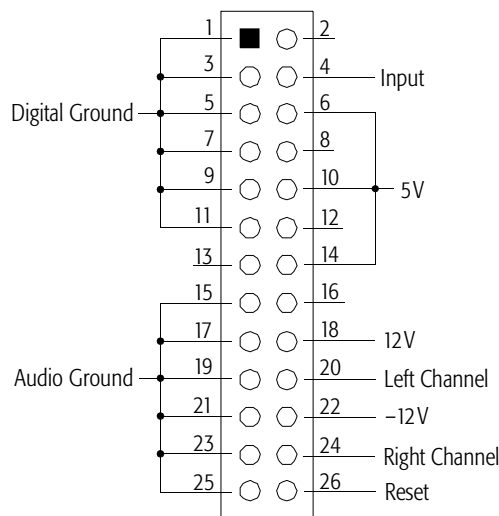


Figure 2-7. Wavetable Connector (J17) Pinouts

Auxilliary Cooling Fan

The motherboard contains a power connector for one cooling fan. The auxilliary fan connector is provided at J26 (see Figure 2-1).

The orientation of the connector does not matter, as the middle pin is the 12-V pin, and the two end pins are both ground (see Figure 2-8).

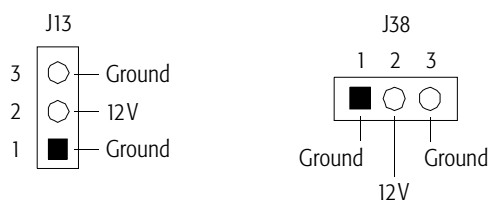


Figure 2-8. Cooling Fan Connector (J13 & J38) Pinouts

Internal Speaker

Connect the speaker on your case to connector J20 (see Figure 2-1). The orientation of the connector doesn't matter.

Infrared Device

If you have an infrared device, such as a cordless mouse or a printer with an infrared port, connect the cable from the infrared sensor to connector J24 (Figure 2-1). The pinouts for the infrared connector are shown in Figure 2-9.

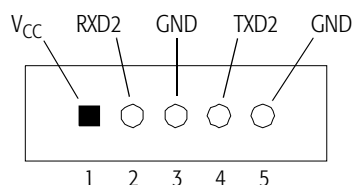


Figure 2-9. Infrared Connector (J28) Pinouts

Install Add-In Cards

Now you're finished connecting all the cables inside the case to the motherboard. If you have any additional add-in cards, insert them in the appropriate expansion slots at this time. The motherboard has either three PCI slots (J5, J8, and J9), two ISA slots (J1 and J2), and one shared ISA/PCI slot (J3/J4). As shown in Figure 2-10, PCI slot 1 corresponds to J9, PCI slot two to J8, PCI slot 3 to J5, and PCI slot 4 to J4.

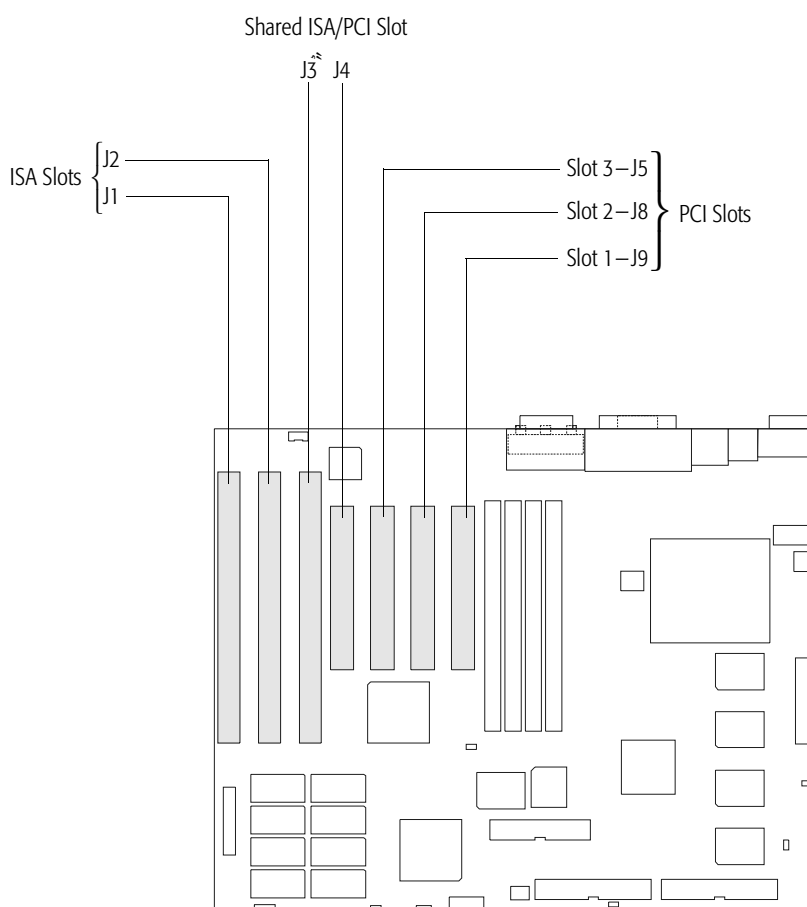


Figure 2-10. ISA and PCI Slot Location

Note: If your motherboard has the S3 ViRGE video chipset, PCI slot J4 is removed from the board, and the shared ISA/PCI slot becomes a dedicated ISA slot.

Make Rear-Panel Connections

You're now ready to hook up your keyboard, mouse, printer, monitor, and any other external devices that connect to the rear-panel I/O connectors. Figure 2-11 details the locations of the motherboard rear-panel I/O connectors. Connect your external devices to their appropriate rear-panel connectors.

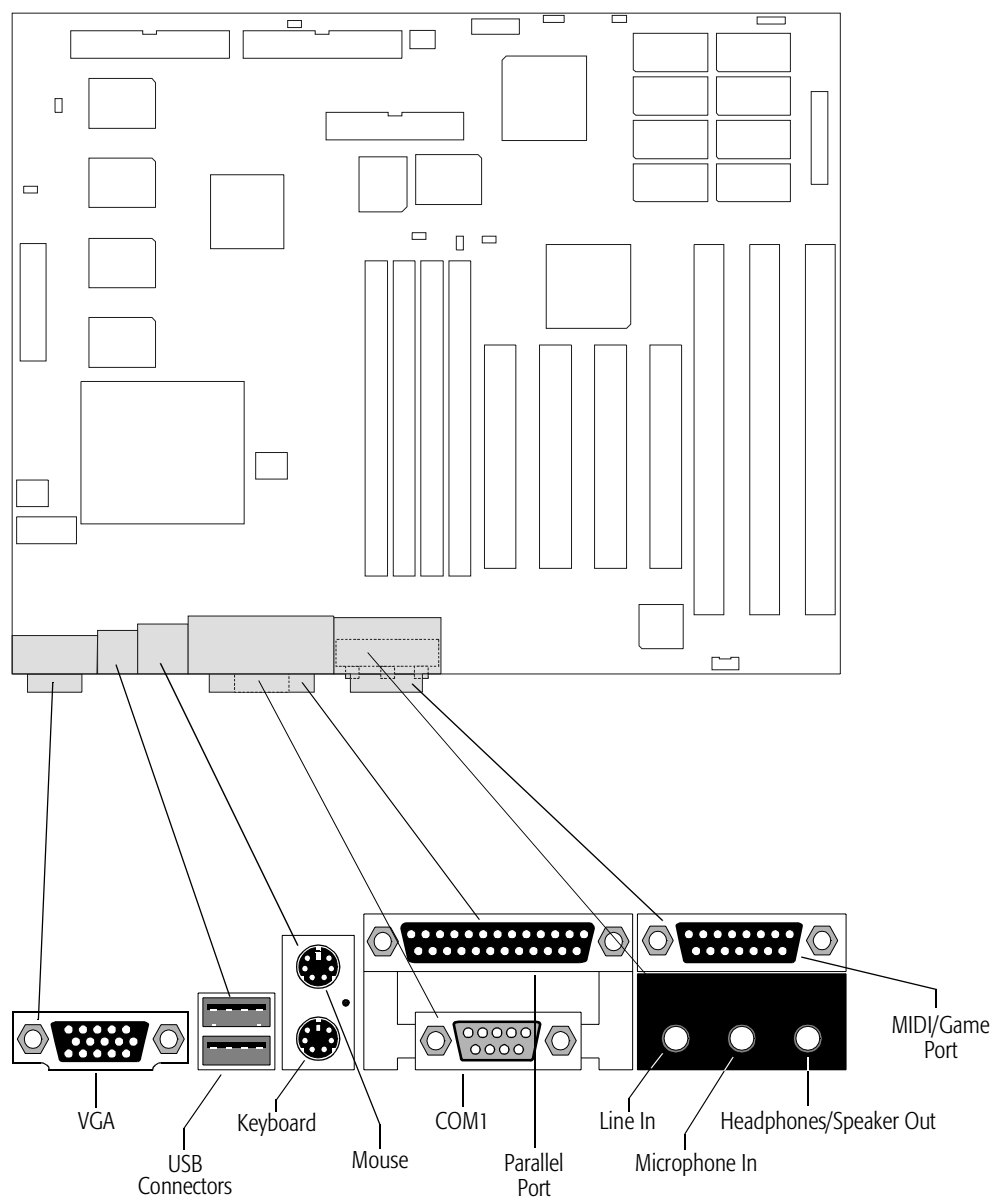


Figure 2-11. Motherboard Rear-Panel I/O Connectors

3

BIOS Setup

The motherboard uses the Award *Elite*BIOS by Award Software, Inc. The BIOS is stored in the AMD 29F002T flash EEPROM, and can be upgraded from diskette (see “Award BIOS Flash Upgrade Utility” on page 61). The setup program lets you modify basic system configuration settings and stores the information in dedicated memory called CMOS memory. The CMOS memory retains the information when the system is powered-off by using a battery to provide backup power.

The Award BIOS in your computer is a customized version of an industry-standard BIOS for IBM PC AT-compatible personal computers. The BIOS has been customized by adding important, but non-standard, features such as virus and password protection, power management, and special support for the detailed fine-tuning of the chipset.

The following sections give detailed instructions for setting up the BIOS. Use these sections to adjust your BIOS parameters for optimum performance. If you encounter any errors during configuration or subsequent reboots of the system, you’ll find a detailed error listing in “POST Messages” (Appendix B) on page 85, and a list of all the BIOS beep and power-on-self-test (POST) codes in “POST Codes” (Appendix C) on page 81.

Award BIOS CMOS Setup Utility

The Award BIOS CMOS setup utility allows the CMOS configuration to be modified. After system configuration modifications are complete, the setup utility stores the changed parameters in CMOS and reboots the system.

Starting the Setup Utility

You can access the setup utility in one of two ways:

- By pressing the key immediately after switching the system on
- By either pressing the key or simultaneously pressing the <Ctrl><Alt><Esc> key combination when the following message is briefly displayed at the bottom of the screen during POST:

TO ENTER SETUP BEFORE BOOT PRESS CTRL-ALT-ESC OR DEL KEY

If you don't press the correct keys before the message is erased, the setup program can still be entered by simply restarting the system. If you don't press the keys at the correct time and the system does not boot, the following error message is displayed:

PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

Setup Keys

Table 3-1 shows the keys available to navigate through the setup program.

Table 3-1. Setup Utility Navigation Keys

Key	Action
Up Arrow	Move to the previous item
Down Arrow	Move to the next item
Left Arrow	Move to the item in the left-hand column
Right Arrow	Move to the item in the right-hand column
Esc	Main Menu: Quit and do not save changes to CMOS Status Page Setup Menu and Option Page Setup Menu: Exit current page and return to the Main Menu
PgUp	Increase the numeric value or make changes

Table 3-1. Setup Utility Navigation Keys (continued)

Key	Action
PgDn	Decrease the numeric value or make changes
+ key	Increase the numeric value or make changes
– key	Decrease the numeric value or make changes
F1	General Help (only for Status Page Setup Menu and Option Page Setup Menu)
F2 Shift-F2	Select screen colors from the available 16 colors F1: Select next color Shift-F1: Select previous color
F3	Calendar (only for Status Page Setup Menu)
F5	Restore the previous CMOS value from CMOS (only for Option Page Setup Menu)
F6	Load the default CMOS value from the BIOS default table (only for Option Page Setup Menu)
F7	Load the default
F10	Save all the CMOS changes (only for Main Menu)

In Case of Problems

If the modifications you make to the configuration parameters don't allow the system to boot, the Award BIOS supports an override function that resets the CMOS to its default settings.

You can invoke the override function by immediately pressing the <Insert> key after restarting the system. You can restart the system by either using the on/off switch, pressing the reset button on the front of the computer, or by simultaneously pressing the <Ctrl>, <Alt>, and keys.

Setup Utility Variations

Not all systems have the same setup. Each system design and chipset combination require custom configurations. The basic look and functions of the setup program remain the same, but the appearance of the setup screens may differ depending on what parts of the setup program are made available by the system designer. The screen figures used in the following sections may differ slightly from the actual screens used in your BIOS setup utility.

Main Setup Menu

The main setup menu is shown in Figure 3-1. The main menu allows selection from several setup functions and two exit choices. Use the arrow keys to select menu items. A brief description of each highlighted selection is displayed at the bottom of the screen. Press the <Enter> key to accept the highlighted choice and enter that sub-menu.

ROM PCI/ISA BIOS (2A5LA001) CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD FEATURES SETUP BIOS FEATURES SETUP CHIPSET FEATURES SETUP POWER MANAGEMENT SETUP PNP/PCI CONFIGURATION LOAD BIOS DEFAULTS LOAD SETUP DEFAULTS	INTEGRATED PERIPHERALS PASSWORD SETTING IDE HDD AUTO DETECTION HDD LOW LEVEL FORMAT SAVE & EXIT SETUP EXIT WITHOUT SAVING
Esc : Quit F10 : Save & Exit Setup	↑ ↓ → ← : Select Item (Shift)F2 : Change Color
Time, Date, Hard Disk Type...	

Figure 3-1. CMOS Setup Utility Main Menu

Standard Features Setup	This selection allows configuration of the original PC AT-compatible BIOS options.
BIOS Features Setup	The Award enhanced BIOS options are configured with this menu selection.
Chipset Features Setup	This selection allows configuration of options specific to the chipset used on the motherboard.

Power Management Setup	Configure the APM options by selecting this option.
PnP/PCI Configuration	The standard Plug-N-Play and PCI local bus options are configured by selection this option.
Load BIOS Defaults	Choosing this selection loads the BIOS defaults. BIOS defaults are factory settings for the most stable, minimal-performance system operations.
Load Setup Defaults	Choosing this selection loads the setup defaults. Setup defaults are factor settings for optimal-performance system operations.
Integrated Peripherals	I/O subsystems that depend on the integrated peripherals controller are configured with this selection.
Password Setting	This option changes, sets, or disables a password. The password function limits access to the setup utility to only those persons who know the password.
IDE HDD Auto Detection	This function automatically detects IDE hard disk drives and configures their parameters.
HDD Low Level Format	<p>This option allows low-level formatting of hard drives.</p> <p>Note: Award provides this function for service personnel only. Most manufacturers of IDE hard drives strongly recommend against low-level formatting their drives, because of the danger that the bad-track table may be over-written.</p> <p>Contact the drive manufacturer for instructions before low-level formatting an IDE hard drive.</p>
Save and Exit Setup	This selection saves the settings in CMOS RAM and exits the setup program.
Exit Without Saving	Choosing this selection abandons all changes and exits the setup program.

Standard Features Setup

Using the standard features setup screen, you can perform the following functions:

- Set the system clock and calendar
- Record hard disk drive parameters
- Select the video subsystem type
- Select the type of errors that stop the BIOS POST

Figure 3-2 shows the standard features setup menu screen.

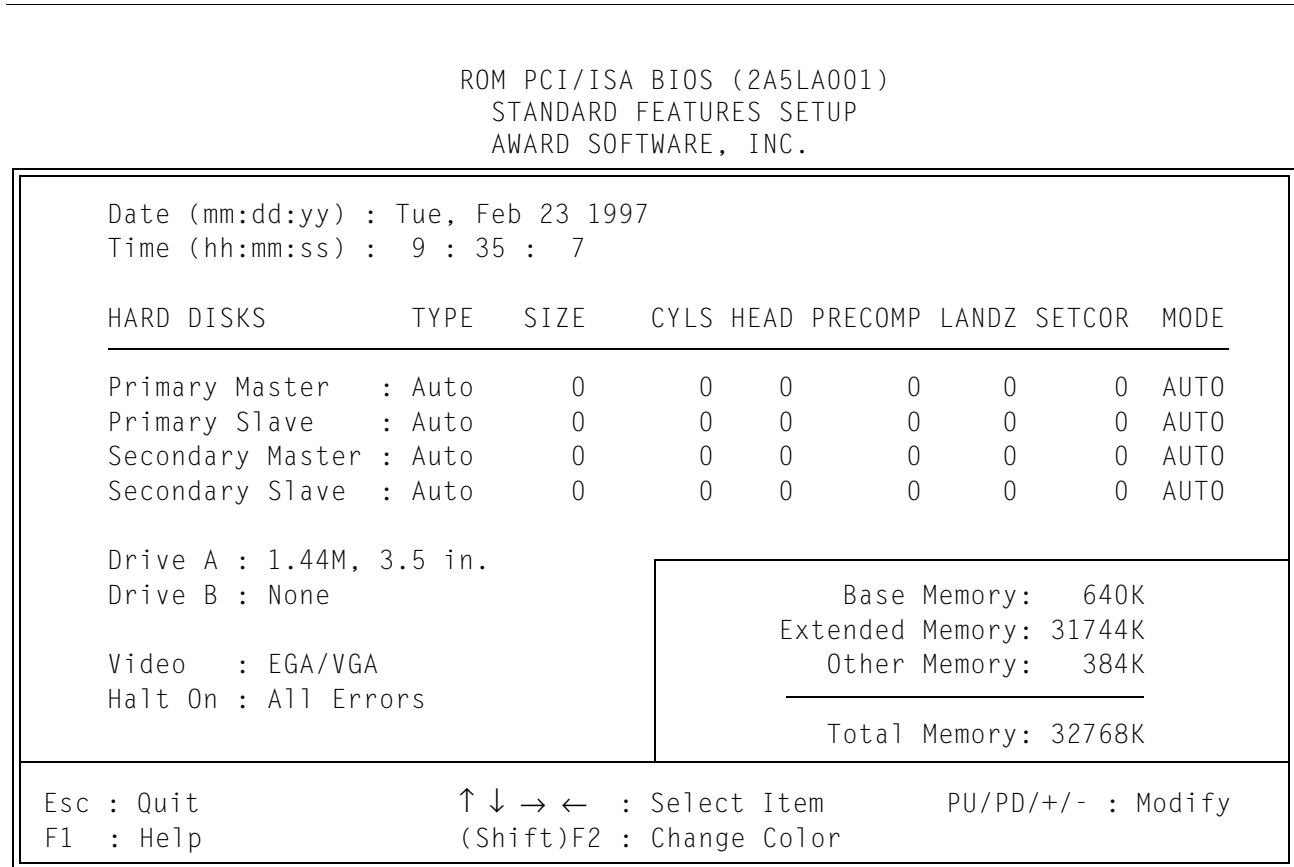


Figure 3-2. Standard Features Setup Screen

Date

All parameters can be adjusted except the day of the week, which is determined automatically from the other date information. Adjust the date as follows:

1. Press the left or right arrow key to move to the field you want to change.
2. Press the <PgUp> or <PgDn> key to increment or decrement the value. You can also type the values directly into the fields.

Time

The time format is based on the 24-hour military-time clock. For example, 1:00 p.m. is 13:00:00 in military time. Adjust the time by following the same procedure used to adjust the date.

Hard Disks

The BIOS supports up to four IDE drives. This section does not show information about other IDE devices, such as CD-ROM drives, nor does it contain information about other types of hard drives, such as SCSI drives.

The BIOS can automatically detect the specifications and optimal operating mode of almost all IDE hard drives. When you select type AUTO, the BIOS detects the hard drive specifications during POST, every time the system boots.

Note: We recommend that type AUTO be selected for all drives.

If you don't want to select drive type AUTO, other methods of selecting the drive type are available:

- Match the specifications of the installed IDE hard drive(s) with the preprogrammed values for drive types 1 through 45
- Select USER and enter values into each drive parameter field
- Use the IDE HDD AUTO DETECTION function in the setup program

Table 3-2 provides a brief description of each drive specification.

Table 3-2. Hard Drive Specification Descriptions

Specification	Description
Type	The BIOS contains a table of pre-defined drive types. Each defined drive type has a specified number of cylinders, number of heads, write pre-compensation factor, landing zone, and number of sectors. Drives with specifications that do not accommodate any pre-defined type are classified as type USER.

Table 3-2. Hard Drive Specification Descriptions (continued)

Specification	Description										
Size	Disk drive capacity (approximate). Note that this size is usually slightly greater than the size of a formatted disk given by a disk-checking program.										
Cyls	Number of cylinders										
Head	Number of heads										
Precomp	Write precompensation cylinder										
Landz	Landing zone										
Sector	Number of sectors										
Mode	<p>Four modes are supported as described below:</p> <table> <tr> <th>Mode</th><th>Description</th></tr> <tr> <td>Auto</td><td>The BIOS automatically determines the optimal mode.</td></tr> <tr> <td>Normal</td><td>The maximum number of cylinders, heads, and sectors supported are 1024, 16, and 63 respectively.</td></tr> <tr> <td>Large</td><td>This mode is for drives that do not support LBA and have more than 1024 cylinders.</td></tr> <tr> <td>LBA</td><td>LBA stands for logical block addressing. During drive accesses, the IDE controller transforms the data address described by sector, head, and cylinder number into a physical block address, significantly improving data transfer rates. This mode is for drives with greater than 1024 cylinders.</td></tr> </table>	Mode	Description	Auto	The BIOS automatically determines the optimal mode.	Normal	The maximum number of cylinders, heads, and sectors supported are 1024, 16, and 63 respectively.	Large	This mode is for drives that do not support LBA and have more than 1024 cylinders.	LBA	LBA stands for logical block addressing. During drive accesses, the IDE controller transforms the data address described by sector, head, and cylinder number into a physical block address, significantly improving data transfer rates. This mode is for drives with greater than 1024 cylinders.
Mode	Description										
Auto	The BIOS automatically determines the optimal mode.										
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LBA	LBA stands for logical block addressing. During drive accesses, the IDE controller transforms the data address described by sector, head, and cylinder number into a physical block address, significantly improving data transfer rates. This mode is for drives with greater than 1024 cylinders.										

**Drive A
Drive B**

Select the correct specifications for the flexible disk drives installed in the computer. The supported flexible disk types are listed in Table 3-3.

Table 3-3. Flexible Disk Types

Type	Description
None	No flexible disk drive installed
360K, 5.25 in	5-1/4-inch, PC-type standard drive—360-Kbyte capacity
1.2M, 5.25 in	5-1/4-inch, AT-type high-density drive—1.2-Mbyte capacity
720K, 3.5 in	3-1/2-inch double-sided drive—720-Kbyte capacity
1.44M, 3.5 in	3-1/2-inch double-sided drive—1.44-Mbyte capacity
2.88M, 3.5 in	3-1/2-inch double-sided drive—2.88-Mbyte capacity

Video

Select the type of primary video subsystem installed in the computer. The BIOS usually detects the correct video type automatically. The BIOS supports a secondary video subsystem, but it cannot be selected in the setup program. Table 3-4 lists the primary video subsystems supported.

Table 3-4. Video Subsystems Supported

Type	Description
EGA/VGA	Enhanced Graphics Adapter/Video Graphics Array—for EGA, VGA, SEGA, SVGA, or PGA monitor adapters
CGA 40	Color Graphics Adapter—power up in 40-column mode
CGA 80	Color Graphics Adapter—power up in 80-column mode
MONO	Monochrome adapter—includes high-resolution monochrome adapters

Halt On

During POST, the system stops if the BIOS detects a hardware error. Select the types of errors that halt the system by choosing one of the selections for this parameter. Table 3-5 lists the available selections.

Table 3-5. Error Type Setup

Error Type	Description
No errors	POST does not stop for any errors
All errors	If the BIOS detects any non-fatal error, POST stops and prompts you to take corrective action

Table 3-5. Error Type Setup (continued)

Error Type	Description
All, But Keyboard	POST does not stop for a keyboard error, but stops for all other errors
All, But Diskette	POST does not stop for diskette drive errors, but stops for all other errors
All, But Disk/Key	POST does not stop for either diskette drive or keyboard errors, but stops for all other errors

Memory

You can't change the values in the memory fields. They are information-only fields. The fields show the total installed memory and the amounts allocated to base memory, extended memory, and other (high) memory.

BIOS Features Setup

The Award enhanced BIOS options are configured using the parameters on this screen. Figure 3-3 shows the available parameters. The values displayed are the default values for all parameters.

ROM PCI/ISA BIOS (2A5LA001)			
BIOS FEATURES SETUP			
AWARD SOFTWARE, INC.			
Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000-CBFFF Shadow	: Disabled
External Cache	: Enabled	CC000-CFFFF Shadow	: Disabled
Quick Power On Self Test	: Disabled	D0000-D3FFF Shadow	: Disabled
Boot Sequence	: A,C	D4000-D7FFF Shadow	: Disabled
Swap Floppy Drive	: Disabled	D8000-DBFFF Shadow	: Disabled
Boot Up Floppy Seek	: Enabled	DC000-DFFFF Shadow	: Disabled
Boot Up NumLock Status	: On		
Boot Up System Speed	: High		
IDE HDD Block Mode	: Enabled		
Gate A20 Option	: Fast		
Memory Parity/ECC Check	: Disabled		
Typematic Rate Setting	: Disabled		
Typematic Rate (Chars/Sec)	: 6		
Typematic Delay (Msec)	: 250	Esc : Quit	↑↓→← : Select Item
Security Option	: Setup	F1 : Help	PU/PD/+/- : Modify
Write Allocate Support	: Enabled	F5 : Old Values (Shift)	F2 : Color
PCI/VGA Palette Snoop	: Disabled	F6 : Load BIOS Defaults	
OS Select For DRAM > 64MB	: Non-OS2	F7 : Load Setup Defaults	

Figure 3-3. BIOS Features Setup Screen

Virus Warning

When virus warning is *enabled*, a warning message is displayed if a program attempts to write to the boot sector on the partition table of the hard drive. This feature protects only the boot sector, not the entire hard drive.

Note: Many disk diagnostic programs that access the boot sector trigger the virus warning message. If such a program is run, we recommend that you first disable the virus warning.

CPU Internal Cache

If the processor has internal cache memory, this feature should be *enabled*.

External Cache	If the motherboard has cache installed, this feature should be <i>enabled</i> .
Quick Power On Self Test	Select <i>enabled</i> to reduce the amount of time required to run the POST. Because a quick POST disables certain steps in the testing sequence, a setting of <i>disabled</i> is recommended.
Boot Sequence	<p>The sequence used to search for an operating system to boot is controlled by this parameter. The possible settings are as follows:</p> <ul style="list-style-type: none">■ A, C■ C, A■ C, CDROM, A■ CDROM, C, A
Swap Floppy Drive	This field is effective only in systems with two floppy drives. Selecting <i>enabled</i> assigns physical drive B to logical drive A and physical drive A to logical drive B.
Boot Up Floppy Seek	When <i>enabled</i> , the BIOS performs a seek on the floppy drives to determine whether they have 40 or 80 tracks. Because only 360-Kbyte floppy drives have 40 tracks, and very few present-day computers have 360-Kbyte floppy drives, we recommend that this parameter be set to <i>disabled</i> to save time booting up.
Boot Up Numlock Status	Toggle this parameter between <i>on</i> and <i>off</i> to control the state of the NumLock key when the system boots. When toggled <i>on</i> , the numeric keypad generates numbers instead of cursor-control operations.
Boot Up System Speed	Select <i>high</i> to boot at the default processor speed. Select <i>low</i> to boot at the speed of the AT bus.
IDE HDD Block Mode	Block mode is also called block transfer, multiple commands, or multiple sector read/write. If the IDE hard drive supports block mode, select <i>enabled</i> for automatic detection of the optimal number of block read/write operations per sector that the drive can support.
Gate A20 Option	Gate A20 refers to the way the system addresses memory above 1 Mbyte (extended memory). When set to <i>fast</i> , the system chipset controls Gate A20. When set to <i>normal</i> , the keyboard controller controls Gate A20. Setting Gate A20 to <i>fast</i> improves system speed, particularly with OS/2 and Windows operating systems.

Memory Parity/ECC Check	Select <i>enabled</i> only if system memory (DRAM) contains parity or is ECC memory. Selecting <i>enabled</i> adds a parity check to the POST memory tests. If the BIOS detects a parity error, a message is displayed describing the problem and the location (if possible) of the problem. The boot process then terminates.
Typematic Rate Setting	When set to <i>disabled</i> , keystrokes repeat at a rate determines by the keyboard controller. When set to <i>enabled</i> , the keystroke-repeat rate is determined by the typematic rate and typematic delay parameters.
Typematic Rate (Chars/Sec)	When the typematic rate setting is <i>enabled</i> , the rate at which characters repeat when keys are held down is determined by this setting. The possible settings are 6, 8, 10, 12, 15, 20, 24, or 30 characters per second.
Typematic Delay (Msec)	When the typematic rate setting is <i>enabled</i> , the delay before keystrokes begin to repeat is determined by this setting. The possible delay settings are 250, 500, 750, or 1000 ms.
Security Option	If a password has been set, this parameter determines whether a password is required every time the system boots, or only when setup is entered. See “Password Setting” on page 52 for information about setting a password.
Write Allocate Support	This parameter enables and disables write allocate support. The default setting is <i>enabled</i> to improve performance.
PCI/VGA Palette Snoop	Leave this setting set to <i>disabled</i> .
OS Select for DRAM > 64MB	Select OS2 only if running OS/2 with greater than 64 Mbytes of memory.
Shadow	<p>Firmware is software that resides in a read-only memory (ROM) chip on a device or the motherboard. The Award BIOS permits shadowing of firmware such as the system BIOS, video BIOS, and similar operating instructions that come with some expansion peripherals (e.g., a SCSI adaptor, a network interface card, etc.).</p> <p>Shadowing copies firmware from ROM into system RAM allowing the processor to access the firmware instructions through the 64-bit DRAM bus. Firmware not shadowed must be read by the system through the slower I/O busses. Shadowing improves the performance of the system BIOS and similar ROM</p>

firmware for expansion peripherals but reduces the amount of high memory (640Kbytes to 1Mbyte) available for loading device drivers, etc.

Enable shadowing into each section of memory separately. Video BIOS shadows into memory area C0000h–C7FFFh. The remaining areas shown on the BIOS features setup screen may be occupied by other expansion-card firmware. If an expansion peripheral in the system contains ROM-based firmware, knowing the address range the ROM occupies is necessary to shadow the firmware into the correct area of memory.

Chipset Features Setup

This section describes setup options for the AMD-640 Chipset chipset. The parameters on this screen are for system designers, service personnel, and technically competent users only. Changes made to parameters on this screen can cause the system to not boot or operate erratically. Caution should be used when modifying any parameters on this screen. Figure 3-4 shows the parameters available for modification. The values displayed are the default values for all parameters.

ROM PCI/ISA BIOS (2A5LA001) CHIPSET FEATURES SETUP AWARD SOFTWARE, INC.	
DRAM Auto Configuration : Disabled DRAM Timing Control : Fast	OnChip USB : Enabled USB Keyboard Support : Disabled
Sustained 3T Write : Disabled 2 Bank PBSRAM : 2-1-1-1 Read Pipeline : Enabled Write Pipeline : Enabled	
Video BIOS Cacheable : Enabled System BIOS Cacheable : Enabled Memory Hole At 15Mb Addr : Disabled	
	Esc : Quit ↑↓→← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift)F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults

Figure 3-4. Chipset Features Setup Screen

DRAM Auto Configuration

When this parameter is *enabled*, DRAM timing is automatically configured for optimal performance. When set to *disabled*, the DRAM timing can be manually adjusted.

DRAM Timing Control

This allows the setting of the memory access timing when DRAM Auto Configuration is enabled. The settings are as follows:

- *Normal*
- *Medium*
- *Fast*
- *Turbo*

Sustained 3T Write

Select *enabled* for optimal performance. Enabling this parameter causes back-to-back write cycles to take three processor clocks to complete.

2 Bank PBSRAM

This parameter determines the pipeline timing sequence for cache accesses. The numbers in the sequence represent the number of clock cycles used for each pipeline access. Table 3-6 lists the available settings.

Table 3-6. PBSRAM Settings

Setting	Description
3-1-1-1	The first pipeline access takes three clock cycles. Each subsequent access takes one clock cycle.
2-1-1-1	The first pipeline access takes two clock cycles. Each subsequent access takes one clock cycle.

Read Pipeline

This parameter enables or disables pipeline read operations.

Write Pipeline

This parameter enables or disables pipeline write operations.

Video BIOS Cacheable

Selecting *enabled* allows caching of the video BIOS, resulting in better video performance.

System BIOS Cacheable

Selecting *enabled* allows caching of the system BIOS, resulting in better performance.

Memory Hole at 15Mb Addr

This parameter allows a part of system memory to be reserved for ISA-adaptor ROM. When reserved, this area of memory cannot be cached. Peripherals requiring this area of system memory usually discuss their memory requirements in the corresponding user documentation.

The available settings are as follows:

- *Disabled*
- *15M–16M*
- *14M–16M*

OnChip USB

This parameter enables or disables USB (universal serial bus) support.

USB Keyboard Support

When this parameter is *enabled*, a USB keyboard can be used.

Power Management Setup

Power management is implemented in the BIOS by allowing the configuration of the various power management parameters. Figure 3-5 shows the power management setup screen. The values displayed are the default values for all parameters.

ROM PCI/ISA BIOS (2A5LA001)			
POWER MANAGEMENT SETUP			
AWARD SOFTWARE, INC.			
Power Management	: Min Saving	IRQ5 (LPT 2)	: Primary
PM Control by APM	: Yes	IRQ6 (Floppy Disk)	: Primary
Video Off Option	: Suspend -> Off	IRQ7 (LPT 1)	: Primary
Video Off Method	: V/H SYNC+BLANK	IRQ8 (RTC Alarm)	: Disabled
Conserve Mode	: Disabled	IRQ9 (IRQ2 Redir)	: Secondary
MODEM Use IRQ	: 3	IRQ10 (Reserved)	: Secondary
** PM Timers **		IRQ11 (Reserved)	: Secondary
HDD Power Down	: Disabled	IRQ12 (PS/2 Mouse)	: Primary
Doze Mode	: 1 Hour	IRQ13 (Coprocesor)	: Primary
Suspend Mode	: 1 Hour	IRQ14 (Hard Disk)	: Primary
** PM Events **		IRQ15 (Reserved)	: Primary
VGA	: OFF	Esc : Quit	↑↓→← : Select Item
LPT & COM	: LPT/COM	F1 : Help	PU/PD/+/- : Modify
HDD & FDD	: ON	F5 : Old Values (Shift)	F2 : Color
DMA/master	: OFF	F6 : Load BIOS Defaults	
Primary INTR	: ON	F7 : Load Setup Defaults	
IRQ3 (COM 2)	: Primary		
IRQ4 (COM 1)	: Primary		

Figure 3-5. Power Management Setup Screen

Power Management

This parameter allows the selection of the type (or degree) of power saving. See “PM Timers” on page 44 for a description of the doze and suspend modes. Table 3-7 defines the available settings.

Table 3-7. Available Power Management Settings

Setting	Description
Disable	Disables power management.
Min Saving	Minimum power management. Inactivity periods of the doze and suspend modes are one hour each
Max Saving	Maximum power management. This setting is only available for SL-type processors. Inactivity periods for the doze and suspend modes are one minute each.
User Define	This setting allows the user to set each mode individually. When not disabled, each activity period ranges from one minute to one hour. Time-out periods are selected in the PM Timers section of the screen.

PM Control by APM

If APM is installed, selecting *yes* gives better power savings.

Video Off Option

Use this parameter to select the power saving modes during which the monitor goes blank. Table 3-8 lists the available settings.

Table 3-8. Available Video-Off Options

Option	Description
Always On	Monitor remains on during power-saving modes.
Suspend --> Off	Monitor blanked when system enters the Suspend mode.
All Modes --> Off	Monitor blanked when system enters any power-saving mode.

Video Off Method

This parameter determines the manner in which the monitor is blanked during power-saving modes. Table 3-9 lists the available options.

Table 3-9. Available Video-Off Methods

Method	Description
V/H SYNC+Blank	System turns off vertical and horizontal synchronization ports and writes blanks to the video buffer.
DPMS Support	Select this option if the monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the software supplied with the video subsystem to select video power management values.
Blank Screen	System only writes blanks to the video buffer.

Conserve Mode

Setting this parameter to *enabled* slows the effective processor speed to 8 MHz, leaving all other system parameters unchanged.

PM Timers

The following modes are Green PC power saving functions that can be enabled or disabled only during User Defined Power Management mode.

HDD Power Down. After the selected period of drive inactivity, the hard disk drive powers down while all other devices remain active.

Doze Mode. After the selected period of system inactivity, the processor clock runs at a slower speed while all other devices still operate at full speed.

Suspend Mode. After the selected period of system inactivity, all devices except the processor shut off.

PM Events

A power-management (PM) event awakens the system from, or resets activity timers for, suspend mode. Monitoring of common interrupt requests can be disabled so they do not generate PM events.

VGA. When set to *on*, any video activity is a PM event.

LPT & COM. When set to *on*, any activity on the selected port or combination of ports generates a PM event. The possible combinations of ports are as follows:

- *None*
- *LPT*
- *COM*
- *LPT/COM*

HDD & FDD. When set to *on*, any hard drive or floppy drive activity generates a PM event.

DMA/master. When set to *on*, any DMA or bus master activity generates a PM event.

Primary INTR. When the system is in suspend mode, IRQ activity can cause a primary or secondary PM event.

- Primary PM event—the system wakes up fully when it detects an IRQ
- Secondary PM event—the system does not wake up, but the interrupt request is processed. Secondary interrupts are typically housekeeping devices needed to maintain the system while not requiring the use of the rest of the system resources. For example, interrupts 10 and 11 (IRQ10 and IRQ11) are configured *secondary* by default.

When on, the following IRQs can be configured as *primary*, *secondary*, or *disabled*:

- | | |
|---------------------|----------------------|
| ■ IRQ3 (COM 2) | ■ IRQ10 (Reserved) |
| ■ IRQ4 (COM 1) | ■ IRQ11 (Reserved) |
| ■ IRQ5 (LPT 2) | ■ IRQ12 (PS/2 Mouse) |
| ■ IRQ7 (LPT 1) | ■ IRQ14 (Hard Disk) |
| ■ IRQ8 (RTC Alarm) | ■ IRQ15 (Reserved) |
| ■ IRQ9 (IRQ2 Redir) | |

PNP/PCI Configuration

The Award BIOS can automatically configure all the boot and Plug-N-Play-compatible devices. Using this configuration screen, the devices can also be manually configured. Figure 3-6 shows the PNP/PCI configuration screen.

ROM PCI/ISA BIOS (2A5LA001) PNP/PCI CONFIGURATION AWARD SOFTWARE, INC.	
Resources Controlled By : Manual Reset Configuration Data : Disabled IRQ-3 assigned to : Legacy ISA IRQ-4 assigned to : Legacy ISA IRQ-5 assigned to : PCI/ISA PnP IRQ-7 assigned to : Legacy ISA IRQ-9 assigned to : PCI/ISA PnP IRQ-10 assigned to : PCI/ISA PnP IRQ-11 assigned to : PCI/ISA PnP IRQ-12 assigned to : PCI/ISA PnP IRQ-14 assigned to : Legacy ISA IRQ-15 assigned to : Legacy ISA DMA-0 assigned to : PCI/ISA PnP DMA-1 assigned to : PCI/ISA PnP DMA-3 assigned to : PCI/ISA PnP DMA-5 assigned to : PCI/ISA PnP DMA-6 assigned to : PCI/ISA PnP DMA-7 assigned to : PCI/ISA PnP	CPU to PCI Write Buffer : Enabled PCI Dynamic Bursting : Enabled PCI Master 0 WS Write : Enabled PCI Peer Concurrency : Enabled PCI Delay Transaction : Enabled PCI IRQ Activated By : Level PCI IDE IRQ Map To : ISA Esc : Quit ↑↓→← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift)F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults

Figure 3-6. PNP/PCI Configuration Screen

Resources Controlled By

The Award Plug-N-Play BIOS can automatically configure all the boot and Plug and Play-compatible devices. If this parameter is set to *auto*, all the interrupt request (IRQ) and DMA assignment fields are not displayed, as the BIOS automatically assigns the IRQ and DMA resources. *Auto* is the default for this parameter.

Reset Configuration Data	Normally, this field is left disabled. If a new add-on device is added to the system that causes such a serious conflict that the operating system cannot boot, select <i>enabled</i> to reset extended system configuration data (ECSD) upon rebooting the system.
IRQ n Assigned To	<p>When resources are controlled manually, assign each system interrupt as one of the following types, depending on the type of device using the interrupt:</p> <ul style="list-style-type: none">■ Legacy ISA—devices compliant with the original PC AT bus specification, requiring a specific interrupt (such as IRQ4 for serial port 1)■ PCI/ISA PnP—devices compliant with the Plug-N-Play standard, whether designed for PCI or ISA bus architecture
DMA n Assigned To	<p>When resources are controlled manually, assign each system DMA channel as one of the following types, depending on the type of device using the interrupt:</p> <ul style="list-style-type: none">■ Legacy ISA—devices compliant with the original PC AT bus specification, requiring a specific DMA channel■ PCI/ISA PnP—devices compliant with the Plug-N-Play standard, whether designed for PCI or ISA bus architecture
CPU to PCI Write Buffer	When this parameter is <i>enabled</i> , writes from the processor to the PCI bus are buffered to compensate for the speed differences between the processor and the PCI bus. When set to <i>disabled</i> , the writes are not buffered and the processor must wait until the write is complete before starting another write cycle.
PCI Dynamic Bursting	Setting this parameter to <i>enabled</i> causes PCI transfers to/from the processor to be bursted whenever possible.
PCI Master 0 WS Write	When set to <i>enabled</i> , writes to the PCI bus are executed with zero wait states.
PCI Peer Concurrency	When this parameter is <i>enabled</i> , a data transfer to a PCI device occurs without tying up either memory or the processor busses. When <i>disabled</i> , memory is assigned to the PCI port.
PCI Delay Transaction	This parameter enables 1-wait-state PCI transfers. When <i>enabled</i> , PCI transfers are delayed by one clock cycle.
PCI IRQ Activated By	Leave the IRQ trigger set at <i>level</i> unless the PCI device assigned to the interrupt specifies Edge-triggered interrupts.

PCI IDE IRQ Map to

This parameter allows selecting either PCI IDE IRQ mapping or PC AT (ISA) interrupts. The possible selections are listed in below:

- ISA
- PCI-Slot 1
- PCI-Slot 2
- PCI-Slot 3
- PCI-Slot 4
- PCI Auto

When any value other than *ISA* is selected, the following two additional parameters can be configured:

- Primary IDE INT#
- Secondary IDE INT#

Each PCI peripheral connection is capable of activating up to four interrupts: INT# A, INT# B, INT# C and INT# D. By default, a PCI connection is assigned INT# A. Assigning INT# B has no meaning unless the peripheral device requires two interrupt services rather than just one. Because the PCI IDE interface in the chipset has two channels, it requires two interrupt services. The primary and secondary IDE INT# fields default to values appropriate for two PCI IDE channels, with the primary PCI IDE channel having a lower interrupt than the secondary.

Integrated Peripherals

The integrated peripherals setup allows the configuration of the following onboard controllers:

- IDE
- FDC (flexible disk controller)
- Serial ports
- Sound
- Video

Figure 3-7 shows the integrated peripherals setup screen. The values displayed are the default values for all parameters.

ROM PCI/ISA BIOS (2A5LA001) INTEGRATED PERIPHERALS AWARD SOFTWARE, INC.	
OnChip IDE First Channel : Enabled OnChip IDE Second Channel: Enabled IDE Prefetch Mode : Enabled IDE Primary Master PIO : Auto IDE Primary Slave PIO : Auto IDE Secondary Master PIO : Auto IDE Secondary Slave PIO : Auto	Onboard Sound Controller : Enabled IDE Primary Master UDMA : Auto IDE Primary Slave UDMA : Auto IDE Secondary Master UDMA : Auto IDE Secondary Master UDMA : Auto
Onboard FDC Controller : Enabled Onboard UART 1 : 3F8/IRQ4 Onboard UART 2 : 2F8/IRQ3 Onboard UART 2 Mode : HPSIR IR Duplex Mode : Half Use IR Pins : IR-RX2TX2 Onboard Parallel Port : 378/IRQ7 Parallel Port Mode : ECP+EPP ECP Mode Use DMA : 3 Parallel Port EPP Type : EPP1.7	Esc : Quit ↑↓→← : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift)F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults

Figure 3-7. Integrated Peripherals Setup Screen

**OnChip IDE First/
Second Channel**

The AMD-640 Chipset contains a PCI IDE interface with support for two IDE channels. Select *enabled* to activate the first and/or second IDE interface. If an add-in IDE controller is installed as either the primary or secondary IDE interface, select *disabled* to deactivate the appropriate onboard channel.

IDE Prefetch Mode

The onboard IDE controller supports IDE prefetching for faster drive accesses. If an add-in IDE controller is installed as either the primary or secondary IDE interface and the add-in IDE controller does not support prefetching, set this parameter to *disabled*.

**IDE
Primary/Secondary
Master/Slave PIO**

The four IDE PIO (programmed input/output) parameters allow setting a PIO mode (0-4) for each of the four IDE devices supported by the onboard IDE interface. Modes 0 through 4 provide successively increased performance. In *auto* mode, the system automatically determines the best mode for each device.

**Onboard FDC
Controller**

If an add-in floppy disk controller is installed or the system has no floppy drive, set this parameter to *disabled*.

Onboard UART 1/2

Select a logical COM port address for the first and second serial ports.

**Onboard UART 2
Mode**

The following modes are supported:

- *Standard*—the second serial port operates as a normal COM port
- *HPSIR*—the second serial port operates as an IrDA-compliant infrared port
- *ASKIR*—the second serial port operates as an amplitude shift keyed infrared port

If *HPSIR* or *ASKIR* mode is chosen, two additional parameters are displayed.

IR Duplex Mode. Select either half or full duplex mode for the infrared port.

Use IR Pins. Select either IR-RX2TX2 or IR-RXTX to use either the first or second transmit/receive pair of pins for the infrared port.

Onboard Parallel Port Select a logical LPT port address for the physical parallel (printer) port. The available choices are as follows:

- *Disabled*
- *378/IRQ7*
- *3BC/IRQ7*
- *278/IRQ5*

Parallel Port Mode Select an operating mode for the onboard parallel port. Select *normal* unless both the hardware and software support EPP or ECP mode. Table 3-10 lists the available options.

Table 3-10. Available Parallel Port Modes

Mode	Description
Normal	PC AT parallel port
EPP (Extended Parallel Port)	Bidirectional port
ECP (Extended Capabilities Port)	Fast, buffered port
ECP+EPP	Fast, buffered, bidirectional port

ECP Mode Use DMA When ECP mode is enabled, select a DMA channel for the parallel port. The default is DMA channel 3.

Parallel Port EPP Type When EPP mode is enabled, select EPP port type 1.7 or 1.9. The default is EPP port type 1.7.

Onboard Sound Controller Select either *enabled* or *disabled* to turn the onboard sound controller on or off.

IDE Primary/Secondary Master/Slave UDMA This parameter enables the use of the new UDMA (ultra direct memory access) IDE mode. This mode is similar to mode 4, but supports data transfer speeds up to 33 MBytes/sec. When this parameter is set to *auto*, the UDMA mode is enabled if both the IDE controller and the IDE drive support UDMA.

Password Setting

This function allows a password to be entered, changed, or cleared as listed in the following procedures.

Entering/Modifying A Password

1. Select the password setting function from the main menu.

When this function is selected from the main menu, a message is displayed at the center of the screen:

ENTER PASSWORD:

2. Type the password, up to eight characters.

Typing a password clears any previously-entered password from CMOS memory.

3. Press the <Enter> key.

After pressing the <Enter> key, the following message is displayed:

CONFIRM PASSWORD:

4. Type the password again.

5. Press the <Enter> key.

To abort the process at any time, press the <Esc> key.

Clearing the Password

1. Select the Password Setting function from the main menu.

When this function is selected from the main menu, a message is displayed at the center of the screen:

ENTER PASSWORD:

2. Press the <Enter> key without entering a password.

This disables the password function.

4

Award BIOS Flash Upgrade Utility

The motherboard uses the AMD 29F002T flash memory chip to store the BIOS code. You can upgrade the flash BIOS using the Award BIOS Flash Upgrade Utility program (the filename of the utility program is *awdflash.exe*). This section briefly describes the flash upgrade utility and contains instructions on its use.

In the examples given here, the file name *newbios.bin* is used to represent the new BIOS and the file name *oldbios.bin* is used to represent the old BIOS.

Awdflash.exe commands are not case-sensitive. Using mixed-case letters in the command examples is for clarity only.

Before Running The Program

The upgrade process requires two files:

- The new BIOS file (*newbios.bin*)
- The upgrade utility (*awdflash.exe*)

Although different media can conceivably be used for the files, this section assumes the files are on floppy disks. Perform the following procedure to prepare for the BIOS upgrade.

1. Create a bootable floppy disk.

2. Transfer the two Award files listed above onto the disk prepared in step 1.

Now the upgrade process can be started.

Note: *DO NOT interrupt the upgrade program while it is running! Interrupting the program leaves the system without a BIOS and unusable. If the power goes off during the few seconds the program requires to run, the system is left without a working BIOS and needs a correctly-programmed flash EPROM installed before the system can boot again.*

Running The Program

The following steps describe a procedure that upgrades a flash BIOS:

1. Boot the system from the bootable floppy disk created in the preceding section.

Booting from the floppy disk bypasses loading drivers from the CONFIG.SYS and AUTOEXEC.BAT files on the hard drive, eliminating the possibility of loading a program that conflicts with the flash upgrade utility.

Note: *The Award flash utility cannot run when EMM386 or QEMM are loaded. An error message is displayed if this is attempted.*

2. At the DOS command line, type `AWDFLASH` and press the <Enter> key.

A screen similar to Figure 4-1 is displayed:

FLASH MEMORY WRITER v5.3x Copyright© 1996, Award Software International, Inc.	
For I430HX-xxxxxxx Flash Type -	DATE: 06/18/96
File Name to Program:	

Figure 4-1. Flash Update Program Screen

The cursor should be opposite File Name to Program:

3. Enter the name of the new BIOS file.

Type NEWBIOS.BIN and press the <Enter> key.

At the bottom of the screen, this prompt is displayed:

Do You Want to Save BIOS (Y/N)?

4. If you **DO NOT** want to save the old BIOS, enter N and press the <Enter> key. Then skip to step 6.

If you **DO** want to save the old BIOS, enter Y and press the <Enter> key.

5. In the File Name to Save field, enter a file name for the old BIOS (for example, OLDBIOS.BIN) and press the <Enter> key.

The old BIOS is saved in the default drive and directory (in this example, drive A) with the filename entered.

6. The following prompt is displayed:

Do You Want to Update? (Y/N)

If you **DO NOT** want to update the BIOS, type N and press the <Enter> key. The program exits to the command line. Skip step 7.

If you **DO** want to update the BIOS, enter Y and press the <Enter> key. When the BIOS is updated, the following message is displayed:

Programming Flash Memory - 3FFFF 0K

Please Power off or Reset System

7. Reboot the system. The BIOS should be successfully updated.

Flash Upgrade Utility Command Line Parameters

The flash upgrade utility can be run from the DOS command line. This section describes the command line parameters and switches and provides examples of their usage.

To obtain a complete list of the parameters available in the version of the utility in use, enter the following command at the DOS prompt followed by the <Enter> key:

```
AWDFLASH /?
```

A screen similar to Figure 4-2 is displayed.

```

FLASH MEMORY WRITER v5.3x
Copyright© 1996, Award Software International, Inc.

AWDFLASH [(FLASH)[PATH][FILENAME]] [/Py,Pn]
          [(SAVE)[PATH][FILENAME]] [/Sy,Sn]
          [(CLEAR CMOS)[/CC]] [(CLEAR PnP)[/CP]]
          [(CLEAR DMI)[/CD]] [/?]

[Py/Pn] PROGRAM BIOS ANSWER Y or N.
[Sy/Sn] SAVE OLDBIOS ANSWER Y or N.
[/?] FOR HELP !
EXAMPLE 1 : AWDFLASH NEWBIOS /Py SAVEBIOS /Sy
EXAMPLE 2 : AWDFLASH NEWBIOS SAVEBIOS /CC
EXAMPLE 3 : AWDFLASH NEWBIOS /Sn /CN
EXAMPLE 4 : AWDFLASH /Pn SAVEBIOS /CC /CD

```

Figure 4-2. Flash Utility Available Options

Save/Update

/P	Program (update) BIOS	switch y or n
/S	Save old BIOS	switch y or n

Example 1. To program a new BIOS and save the old BIOS, enter the following command and press the <Enter> key:

```
AWDFLASH newbios.bin /Py oldbios.bin /Sy
```

The program saves the old BIOS to the file as named and updates the BIOS with the new BIOS.

Example 2. To program a new BIOS without saving the old BIOS, enter the following command and press the <Enter> key:

```
AWDFLASH newbios.bin /Sn
```

After executing this command, the program displays the following prompt:

```
Do You Want to Update? (Y/N)
```

Type Y in response.

Example 3. To save the old BIOS to a file without updating it, enter the following command and press the <Enter> key:

```
AWDFLASH /Pn oldbios.bin /Sy
```

Clear Data

The Award flash utility version 5.31 and above supports three additional command line parameters:

```
/CC   Clear CMOS  
/CP   Clear PnP data (ESCD)  
/CD   Clear DMI data
```


Appendix A

Technical Information

This appendix contains the following connector information:

- Pinout diagrams and/or information for all ports and connectors not detailed elsewhere in this book
- Pinout diagrams for the ISA and PCI expansion slots

Original AT technical information is included as follows:

- Timer and DMA channels map
- I/O and memory map
- Interrupt map
- RTC and CMOS RAM map

Connector Pinouts and Port Information

NS16C550-Compatible Serial Port

The serial port implementation is compatible with the NS16C550 UART and contains a 16-byte send/receive FIFO. The serial port supports transfer rates up to 460,800 baud. The serial port is contained in the bottom half of the rear-panel, stacked serial/parallel connector. One 9-pin DB9 serial connector is provided. The pinout diagram for the serial connector is shown in Figure A-1. The second serial port is used as an IR port on the motherboard.

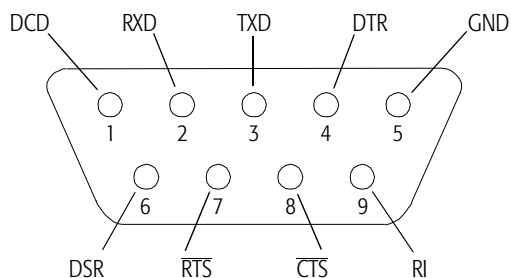


Figure A-1. DB9 Serial Connector Pinouts

Parallel Port

The motherboard parallel port implementation is IEEE 1284-compatible supporting both EPP and ECP. The parallel port is contained in the top half of the rear-panel, stacked serial/parallel connector. The pinout diagram for the parallel port is shown in Figure A-2.

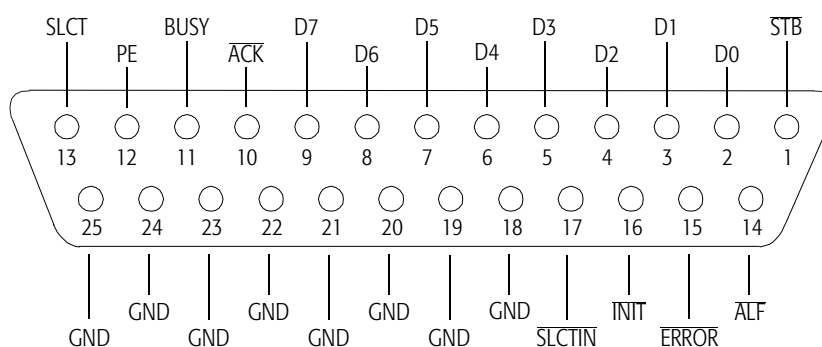


Figure A-2. Parallel Port Pinouts

Keyboard/Mouse Controller

The PS/2-style keyboard/mouse controller is a standard 8742-compatible implementation and is accessed via the rear-panel, stacked keyboard/mouse connector. The keyboard connector is the top half and the mouse/auxiliary device connector is the bottom half of the rear-panel, stacked connector. Figure A-3 shows the pinouts for the keyboard/mouse connector.

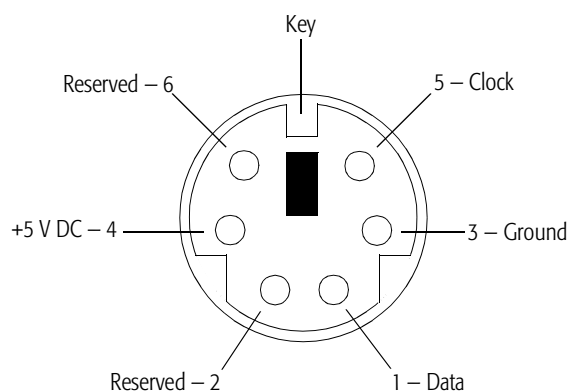


Figure A-3. Keyboard/Mouse Connector Pinouts

USB Controller

The USB controller is USB V1.0- and Intel Universal HCI V1.1-compatible. The controller includes a root hub with two function ports, each with built-in physical layer transceivers. The two features ports are available for use in a rear-panel, stacked USB connector. USB port 0 is the bottom half of the connector and port 1 is the top half. The controller also provides legacy keyboard and PS/2 mouse support. Figure A-4 shows the pinouts of the USB port connector.

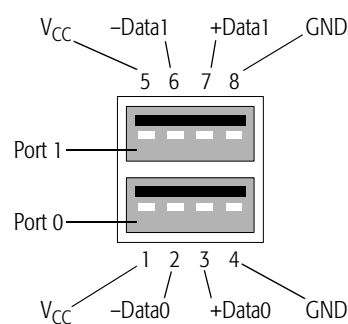


Figure A-4. USB Port 0 and Port 1 Pinouts

IDE Connectors

The pinouts of the IDE connectors are described in Table A-1.

Table A-1. IDE/EIDE Connector Pinouts

Pin	Signal Name	Pin	Signal Name
1	Reset IDE	21	DDRQ0 (DDRQ1)
2	Ground	22	Ground
3	Host Data 7	23	I/O Write
4	Host Data 8	24	Ground
5	Host Data 6	25	I/O Read
6	Host Data 9	26	Ground
7	Host Data 5	27	IOCHRDY
8	Host Data 10	28	CSEL
9	Host Data 4	29	DDACK0 (DDACK1)
10	Host Data 11	30	Ground
11	Host Data 3	31	IRQ14 (IRQ15)
12	Host Data 12	32	Reserved
13	Host Data 2	33	Addr 1
14	Host Data 13	34	Reserved
15	Host Data 1	35	Addr 0
16	Host Data 14	36	Addr 2
17	Host Data 0	37	Chip Select 1P (Chip Select 1S)
18	Host Data 15	38	Chip Select 3P (Chip Select 3S)
19	Ground	39	Activity
20	Key	40	Ground

Flexible Disk Connector

The pinouts for the flexible disk drive connector are described in Table A-2.

Table A-2. Flexible Disk Drive Connector Pinouts

Pin	Signal Name	Pin	Signal Name
1	Ground	18	DIR
2	DENSEL	19	Ground
3	Ground	20	STEP
4	N/C	21	Ground
5	Key	22	Write Data
6	FDEDIN	23	Ground
7	Ground	24	Write Gate
8	Index	25	Ground
9	Ground	26	Track 00
10	Motor Enable A	27	MSEN0
11	Ground	28	Write Protect
12	Drive Select B	29	Ground
13	Ground	30	Read Data
14	Drive Select A	31	Ground
15	Ground	32	Side 1 Select
16	Motor Enable B	33	Ground
17	MSEN1	34	Diskette Change

PCI and ISA Expansion Slot Pinouts

PCI-Bus Expansion-Slot Connectors

All PCI expansion slots are full-length and have the following characteristics:

- Conform to PCI Specification Revision 2.1 or higher
- 3.3 V-signaling PCI adapters are not supported
- 3.3 V is not supplied to the PCI connectors

Table A-3 describes the PCI-slot pinouts.

Table A-3. PCI Connector Pinouts

Pin	Signal Name	Pin	Signal Name
A1	V _{CC}	B1	-12 V
A2	+12 V	B2	TCK
A3	TMS	B3	Ground
A4	TD1	B4	TD0
A5	V _{CC}	B5	V _{CC}
A6	INTA	B6	V _{CC}
A7	INTC	B7	INTB
A8	V _{CC}	B8	INTD
A9	Reserved	B9	Prsnt1
A10	V _{CC}	B10	Reserved
A11	Reserved	B11	Prsnt2
A12	Ground	B12	Ground
A13	Ground	B13	Ground
A14	Reserved	B14	PAR
A15	SPCIRST	B15	Ground
A16	V _{CC}	B16	PCLKE
A17	AGNT	B17	Ground
A18	Ground	B18	REQA
A19	Reserved	B19	V _{CC}
A20	AD30	B20	AD31

Table A-3. PCI Connector Pinouts (continued)

Pin	Signal Name	Pin	Signal Name
A21	3.3 V	B21	AD29
A22	AD28	B22	Ground
A23	AD26	B23	AD27
A24	Ground	B24	AD25
A25	AD24	B25	3.3 V
A26	IDSEL	B26	$\overline{\text{CBE}}_3$
A27	3.3 V	B27	AD23
A28	AD22	B28	Ground
A29	AD20	B29	AD21
A30	Ground	B30	AD19
A31	AD18	B31	3.3 V
A32	AD16	B32	AD17
A33	3.3 V	B33	$\overline{\text{CBE}}_2$
A34	FRAME	B34	Ground
A35	Ground	B35	IRDY
A36	TRDY	B36	3.3 V
A37	Ground	B37	DEVSEL
A38	STOP	B38	Ground
A39	3.3 V	B39	PLOCK
A40	SDONE	B40	PERR
A41	$\overline{\text{SBO}}$	B41	3.3V
A42	Ground	B42	$\overline{\text{SERR}}$
A43	PAR	B43	3.3 V
A44	AD15	B44	$\overline{\text{CBE}}_1$
A45	3.3 V	B45	AD14
A46	AD13	B46	Ground
A47	AD11	B47	AD12
A48	Ground	B48	AD10
A49	AD9	B49	Ground
A50	KEY	B50	KEY
A51	KEY	B51	KEY
A52	$\overline{\text{CBE}}_0$	B52	AD8
A53	3.3 V	B53	AD7
A54	AD6	B54	3.3 V

Table A-3. PCI Connector Pinouts (continued)

Pin	Signal Name	Pin	Signal Name
A55	AD4	B55	AD5
A56	Ground	B56	AD3
A57	AD2	B57	Ground
A58	AD0	B58	AD1
A59	V _{CC}	B59	V _{CC}
A60	$\overline{SREQ64}$	B60	$\overline{SACK64}$
A61	V _{CC}	B61	V _{CC}
A62	V _{CC}	B62	V _{CC}

ISA-Bus Expansion-Slot Connectors

Table A-4. ISA Connector Pinouts

Pin	Signal Name	Pin	Signal Name
B1	Ground	A1	IOCHK
B2	RSTDRV	A2	SD7
B3	V _{CC}	A3	SD6
B4	IRQ9	A4	SD5
B5	-5 V	A5	SD4
B6	DRQ2	A6	SD3
B7	-12 V	A7	SD2
B8	\overline{OWS}	A8	SD1
B9	+12 V	A9	SD0
B10	Ground	A10	IOCHRDY
B11	\overline{SMEMW}	A11	AEN
B12	\overline{SMSMR}	A12	SA19
B13	\overline{IOW}	A13	SA18
B14	\overline{IOR}	A14	SA17
B15	$\overline{DACK3}$	A15	SA16
B16	DRQ3	A16	SA15
B17	$\overline{DACK1}$	A17	SA14
B18	DRQ1	A18	SA13
B19	REFRESH	A19	SA12
B20	SYSCLK	A20	SA11
B21	IRQ7	A21	SA10
B22	IRQ6	A22	SA9
B23	IRQ5	A23	SA8
B24	IRQ4	A24	SA7
B25	IRQ3	A25	SA6
B26	$\overline{DACK2}$	A26	SA5
B27	TC	A27	SA4
B28	BALE	A28	SA3
B29	V _{CC}	A29	SA2
B30	OSC	A30	SA1
B31	Ground	A31	SA0
KEY		KEY	

Table A-4. ISA Connector Pinouts (continued)

Pin	Signal Name	Pin	Signal Name
D1	MEMCS16	C1	SBHE
D2	IOCS16	C2	LA23
D3	IRQ10	C3	LA22
D4	IRQ11	C4	LA21
D5	IRQ12	C5	LA20
D6	IRQ15	C6	LA19
D7	IRQ14	C7	LA18
D8	DACK0	C8	LA17
D9	DRQ0	C9	MEMR
D10	DACK5	C10	MEMW
D11	DRQ5	C11	SD8
D12	DACK6	C12	SD9
D13	DRQ6	C13	SD10
D14	DACK7	C14	SD11
D15	DRQ7	C15	SD12
D16	V _{CC}	C16	SD13
D17	Master	C17	SD14
D18	Ground	C18	SD15

Timer and DMA Channels Map

Table A-5. Timer and DMA Channels Map

Channel	Description
Timer	
0	System timer interrupt
1	DRAM REFRESH request
2	Speaker tone generator
DMA	
0	Available
1	Available
2	Floppy disk controller
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

I/O and Memory Map

Table A-6. I/O Map

Location (Hex)	Description
000 - 01F	DMA controller (master)
020 - 021	Interrupt controller (master)
022 - 023	Chipset control registers I/O ports
040 - 05F	Timer control registers
060 - 06F	Keyboard interface controller (8042)
070 - 07F	RTC ports and CMOS I/O ports
080 - 09F	DMA register
0A0 - 0BF	Interrupt controller (slave)
0C0 - 0DF	DMA controller (slave)
0F0 - 0FF	Math coprocessor
1F0 - 1F8	Hard disk controller
278 - 27F	Parallel port 2
2B0 - 2DF	Graphics adapter controller
2F8 - 2FF	Serial port 2
360 - 36F	Network ports
378 - 37F	Parallel port 1
3B0 - 3BF	Monochrome and printer adapter
3C0 - 3CF	EGA adapter
3D0 - 3DF	CGA adapter
3F0 - 37F	Floppy disk controller
3F8 - 3FF	Serial port 1

Table A-7. Memory Map

Location (Hex)	Description
0000000 - 009FFFF	System memory used by DOS and application program
00A0000 - 00BFFFF	Display buffer memory for VGA/EGA/CGA/Monochrome video adapter
00C0000 - 00DFFFF	Reserved for I/O device BIOS ROM or RAM buffer
00E0000 - 00EFFFF	Reserved for PCI device ROM
00F0000 - 00FFFFFF	system BIOS ROM
0100000 - BFFFFFFF	System extension memory

Interrupt Map

Table A-8. Interrupt Map

Interrupt	Description
NMI	Parity check error
IRQ 0	System timer interrupt from timer 0
IRQ 1	Keyboard output buffer full
IRQ 2	Cascade for IRQ 9–15
IRQ 3	Serial port 2
IRQ 4	Serial port 1
IRQ 5	Parallel port 2
IRQ 6	Floppy disk controller
IRQ 7	Parallel port 1
IRQ 8	RTC clock
IRQ 9	Available
IRQ 10	Available
IRQ 11	Available
IRQ 12	PS/2 Mouse
IRQ 13	Math coprocessor
IRQ 14	Primary Hard disk drive controller
IRQ 15	Secondary hard disk drive controller

RTC and CMOS RAM Map

Table A-9. RTC and CMOS RAM Map

Location (Hex)	Description
00	Seconds
01	Seconds alarm
02	Minutes
03	Minutes alarm
04	Hours
05	Hours alarm
06	Day of the week
07	Day of the month
08	Month
09	Year
0A	Status register A
0B	Status register B
0C	Status register C
0D	Status register D
0E	Diagnostic status byte
0F	Shutdown byte
10	Floppy-disk-drive-type byte
11	Reserved
12	Hard-disk-type byte
13	Reserved
14	Equipment byte
15	Base memory low byte
16	Base memory high byte
17	Extension memory low byte
18	Extension memory high byte
19-2D	—
2E-2F	—
30	Reserved for extension memory low byte
31	Reserved for extension memory high byte
32	Date-century byte
33	Information flag

Table A-9. RTC and CMOS RAM Map

Location (Hex)	Description
34 - 3F	Reserved
40 - 7F	Reserved for chipset setting data

Appendix B

POST Messages

During POST, the BIOS either sounds a beep code or displays a message when a correctable error is detected. An error message is followed by the following message:

PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

POST Beep Messages

Currently, the only beep code indicates that a video error has occurred, and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps.

POST Error Messages

The following is an alphabetical list of POST error messages for the ISA BIOS.

CMOS BATTERY HAS FAILED

CMOS battery is no longer functional. The battery should be replaced.

CMOS CHECKSUM ERROR

Checksum of CMOS is incorrect. This can indicate that CMOS is corrupted. This error can be caused by a weak battery. Check the battery and replace if necessary.

DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS RETURN

No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain proper system boot files. Insert a system disk into drive A: and press the <Enter> key. If the system is set up to boot from the hard drive, make sure all cables are properly attached. If using an add-in hard drive controller, make sure the controller card is installed correctly. Also make sure the disk is formatted as a boot device. Reboot the system.

DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP

The type of diskette drive installed in the system is different from the CMOS definition. Run setup to reconfigure the drive type correctly.

DISPLAY TYPE HAS CHANGED SINCE LAST BOOT

Since last powering off the system, the display adapter has been changed. The system must be configured for the new display type.

ERROR ENCOUNTERED INITIALIZING HARD DRIVE

The hard drive cannot be initialized. If using an add-in controller, make sure the controller card is installed correctly. Check that all cables are correctly and firmly attached. Also make sure the correct hard drive type is selected in setup.

ERROR INITIALIZING HARD DISK CONTROLLER

The hard drive controller cannot be initialized. If using an add-in controller, make sure the card is correctly and firmly installed. Make sure the correct hard drive type is selected in

Setup. Also check to see that the hard drive jumpers are configured correctly.

FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT

Cannot find or initialize the floppy drive controller. If using an add-in controller, make sure the card is correctly and firmly installed. If there are no floppy drives installed, make sure the diskette drive selection in setup is set to *NONE*.

KEYBOARD ERROR OR NO KEYBOARD PRESENT

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

If the system is purposely configured without a keyboard, set the error halt condition in Setup to *HALT ON ALL, BUT KEYBOARD*. This setting causes the BIOS to ignore the missing keyboard and continue the boot.

Memory Address Error at ...

This error indicates a memory address error at a specific location. If this location and the memory map for the system are known, the bad memory SIMMS can be found and replaced.

MEMORY SIZE HAS CHANGED SINCE LAST BOOT

Memory has been added or removed since the last boot. Enter setup and choose *save and exit setup* to update the memory size in CMOS memory.

Memory Verify Error at ...

Indicates an error verifying a value already written to memory. Use the location and the system memory map to locate the bad SIMM.

OFFENDING ADDRESS NOT FOUND

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that caused the problem cannot be isolated.

OFFENDING SEGMENT:

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

PRESS A KEY TO REBOOT

This message is displayed at the bottom of the screen when an error occurs that requires a system reboot. Press any key to reboot the system.

PRESS F1 TO DISABLE NMI, F2 TO REBOOT

When the BIOS detects a non-maskable interrupt condition during boot, NMI can be disabled and the boot continued, or the system can be rebooted with the NMI enabled.

RAM PARITY ERROR - CHECKING FOR SEGMENT ...

Indicates a parity error in Random Access Memory.

SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...

Indicates the present boot attempt has been aborted and the system must be rebooted. Press <Ctrl><Alt> to reboot the system.

Appendix C

POST Codes

Table C-1 lists the Award BIOS POST codes. Only the ISA-bus POST codes are included in the table.

Note: ISA POST codes are output to port address 80h.

Table C-1. Award BIOS POST Codes

Code (Hex)	Name	Description
C0	Turn Off Chipset Cache	OEM-specific cache control
1	Processor Test 1	Processor Status (1FLAGS) Verification Tests the carry, zero, sign, and overflow status flags by setting each flag, verifying it is set, turning each off, and verifying it is off
2	Processor Test 2	Read/Write/Verify all CPU registers except SS, SP, and BP with data pattern FFh and 00h
3	Initialize Chips	Disable NMI, PIE, AIE, UEI, and SQWV Disable video, parity checking, and DMA Reset math coprocessor Clear all page registers and CMOS shutdown byte Initialize timer 0, 1, and 2 Initialize DMA controllers 0 and 1 Initialize interrupt controllers 0 and 1

Table C-1. Award BIOS POST Codes (continued)

Code (Hex)	Name	Description
4	Test Memory Refresh Toggle	RAM must be periodically refreshed to keep the memory from decaying. This function assures that the memory refresh function is working properly
5	Blank Video, Initial Keyboard	Keyboard controller initialization
6	Reserved	
7	Test CMOS Interface and Battery Status	Verifies that CMOS is working correctly and detects a bad battery
BE	Chipset Default Initialization	Program the chipset registers with the power-on BIOS defaults
C1	Memory Presence Test	OEM-specific test to size onboard memory
C5	Early Shadow	OEM-specific early-shadow enable for fast boot
C6	Cache Presence Test	External cache size detection
8	Setup Low Memory	Early chip set initialization Memory presence test OEM chip set routines Clear low 64 Kbytes of memory Test first 64 Kbytes of memory
9	Early Cache Initialization	Cache initialization
A	Setup Interrupt Vector Table	Initialize the first 120 interrupt vectors with SPURIOUS_INT_HANDLER and initialize INT 00h – 1Fh according to INT_TBL.
B	Test CMOS Ram Checksum	Test the CMOS RAM checksum, and if bad, or the <Ins> key is pressed, load the defaults
C	Initialize Keyboard	Detect the type of keyboard controller(optional) and set the NUM_LOCK status
D	Initialize Video Interface	Detect the CPU clock Read CMOS location 14h to find out the type of video in use Detect and initialize the video adapter
E	Test Video Memory	Test video memory and write the sign-on message to the screen Setup the shadow RAM—enable shadow according to Setup
F	Test DMA Controller 0	BIOS checksum test. Keyboard detect and initialization
10	Test DMA Controller 1	
11	Test DMA Page Registers	Test the DMA page registers
12–13	Reserved	
14	Test Timer Counter 2	Test the 8254 Timer 0, Counter 2

Table C-1. Award BIOS POST Codes (continued)

Code (Hex)	Name	Description
15	Test 8259-1 Mask Bits	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines
16	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines
17	Test Stuck 8259's Interrupt Bits	Turn off interrupts then verify that no interrupt mask register is on
18	Test 8259 Interrupt Functionality	Force an interrupt and verify that the interrupt occurred
19	Test Stuck NMI Bits (Parity/IO Check)	Verify that NMI can be cleared
1A		Display the CPU clock
1B–1E	Reserved	
30	Size Base And Extended Memory	Size base memory from 256 Kbytes to 640 Kbytes and extended memory above 1 Mbyte
31	Test Base And Extended Memory	Test base memory from 256 Kbytes to 640 Kbytes and extended memory above 1 Mbyte using various patterns <i>Note: This test can be skipped by pressing the <Esc> key.</i>
33–3B	Reserved	
3C	Setup Enabled	
3D	Initialize & Install Mouse	Detect if a mouse is present, initialize the mouse, and install the mouse interrupt vectors
3E	Setup Cache Controller	Initialize the cache controller
3F	Reserved	
BF	Chipset Initialization	Program the chipset registers with Setup values
40		Display virus protect disable or enable
41	Initialize Floppy Drive & Controller	Initialize the floppy disk drive controller and any drives
42	Initialize Hard Drive & Controller	Initialize the hard drive controller and any drives
43	Detect & Initialize Serial/parallel Ports	Initialize any serial and parallel ports (also the game port)
44	Reserved	
45	Detect & Initialize Math Coprocessor	Initialize the math coprocessor
46–4D	Reserved	
4E	Manufacturing Post Loop Or Display Messages	Reboot if the Manufacturing POST Loop pin is set. Otherwise, display any messages (i.e., any non-fatal errors that were detected during POST) and enter Setup
4F	Security Check	Ask password security (optional)
50	Write CMOS	Write all CMOS values back to RAM and clear the screen
51	Pre-boot Enable	Enable the parity checker, NMI, and cache before boot.

Table C-1. Award BIOS POST Codes (continued)

Code (Hex)	Name	Description
52	Initial Option ROMs	Initialize any option ROMs present from C8000h to EFFFFh <i>Note: When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.</i>
53	Initialize Time Value	Initialize the time value in 40h: BIOS area
60	Setup Virus Protect	Setup the virus protection according to Setup
61	Set Boot Speed	Set the system speed for boot
62	Setup NumLock	Setup NumLock status according to Setup
63	Boot Attempt	Set low stack and boot via INT 19h
B0	Spurious	If interrupt occurs in protected mode
B1	Unclaimed NMI	If an unmasked NMI occurs, display PRESS F1 TO DISABLE NMI, F2 TO REBOOT
E1 – EF	Setup Pages	E1 – page 1, E2 – page 2, etc.
FF	Boot	